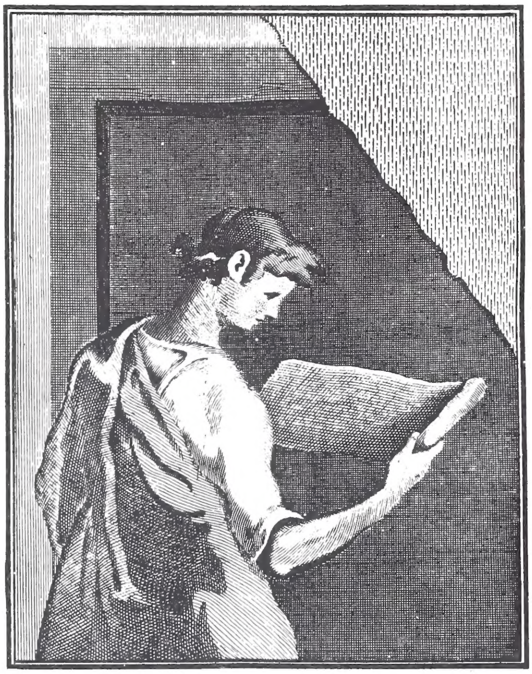

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THE FUTURE OF PHOTOGRAPHIC PRINTING.

At the commencement of a new year it may not be considered out of place to take a brief retrospective glance at the state in which we now find ourselves with regard to photographic printing, and to peer into the future in the hope of discovering in which direction our path tends. We find this task not only more appropriate to the occasion, but almost necessary when we look back at the immense strides which have been made in the course of the last few years, and especially during the one just past, in the many different styles of printing now in vogue; and it will be our endeavour to arrive at a conclusion as to which out of the many will be eventually found to best answer both for general and special purposes.

In considering this subject it will be necessary to view it from various points, and to weigh the advantages of one process under certain circumstances against the benefits likely to ensue from another when the conditions may be different. In doing this we shall treat the question as it affects amateurs, professionals, and publishers, the latter of whom may be again subdivided into distinct classes according to their special requirements.

Up to within a very few years the only method of printing which was recognised as a practicable process, and which was consequently employed for nearly all purposes, was that of silver printing upon albumenised paper. This, which for many years has continued to give satisfaction, both from the beauty of its results and the ease of the manipulations connected with it, is now generally supposed to be going out of use, in consequence of the introduction of other methods which combine with the perfection of results hitherto secured a greater degree of permanency; but, unfortunately, these new methods possess other disadvantages on the score of intricacy of manipulation or the necessity for special apparatus of a costly description. Under certain circumstances, however, these disadvantages disappear, and it is this fact which constitutes the ulility or otherwise of any specific process for a special purpose.

Let us first take the case of an amateur. The particular requirements in such a case are the production of a limited number of prints of the finest quality in the simplest manner possible, and without the intervention of expensive or delicate apparatus. These conditions have been fulfilled by the old method of printing upon albumenised paper; but, unfortunately, Nemesis appears in the shape of the want of permanency charged against such pictures. To what extent this charge may be well grounded we shall not here stay to discuss, suffice it that an outcry has been raised for greater permanence. Custom here steps in and insists that the general appearance of the print shall not differ from the old style, and until the public taste be sufficiently educated custom demands attention.

We are thus left to cast about among the numerous processes of impression in permanent pigments for the one which shall best comply with the conditions laid down above—a selection which is by no means restricted. Amongst such processes we may name the autotype or "carbon" process, the Woodburytype, the heliotype, and other forms of photolithography, phototypography, and photo-engraving. The two latter we may leave entirely out of consideration in connection with amateur work, except for special or experimental purposes. The second and third depart from the conditions laid down, in requiring special apparatus in the shape of presses, &c., which are not usually found amongst the plant of an amateur, and to supply which, moreover, would lead to very great expense.

The only remaining method, then, is the autotype, the chief argument in favour of which lies in the fact that the printing takes place directly from the negative without the intervention of any special apparatus or the production of any intermediate printing surface. In addition to this the materials may be obtained, of the highest possible quality, with as great facility as in the case of the old method. An amateur is thus enabled to print either one or one hundred impressions as he may prefer or find necessary; the results are, too, almost indistinguishable, except by an expert, from those produced upon albumenised paper. Here, however, the question arises as to the nature of the manipulations, and it is this which stops the majority of amateurs from practising a really valuable process.

The difficulties which arise are, first, the necessity for the employment of some form of actinometer, and, secondly, the delicate nature of the development of the individual prints. Method, however, combined with a little practice, will be found to perform wonders in smoothing away the obstructions to the use of the carbon tissue; but we are afraid it will yet be some time before this process takes the place of silver printing in the general routine of the ordinary amateur.

Attempts have been made to render the Woodburytype process available for amateurs by suppressing the use of the hydraulic press, and substituting for the metal intaglio produced by its means relief impressions formed of wax, gutta-percha, or other plastic material; but, though some of these methods have been favourably spoken of, the necessity still remains for a second press—certainly of simple construction—as well as *two* intermediate operations, before a single print can be obtained. The objections to the use of any form of photo-litho process are similar in character, namely, the necessity for a special press and the production of an additional printing surface, which, in the case of an amateur who may probably require no more than at the most a dozen prints from one negative, appears an unnecessary labour.

We may now look at the subject from the standpoint of the professional portraitist. The conditions are here similar in many respects to those in the previous case. The great majority of portrait negatives taken in the course of a year are probably never required after the first dozen prints have been delivered, and it therefore appears next to impossible, without considerably altering the prices at present in vogue, to resort to any process of printing which entails the production of an extra printing surface in order to print a single dozen impressions. Here, then, it would seem that the only available method is again the autotype, which process, it is well known, is in ordinary use in very many studios throughout the country, thus proving that the difficulties at first urged against its use were all purely visionary.

But in the case of those members of the profession who make a *specialité* of the publication of portraits of celebrities the con-

ditions are considerably altered. The slowness of production of the autotype method compels it to give place to some more rapid means, and if this class of business be sufficiently large it will enable the photographer to lay down the necessary plant with a prospect of rendering it pecuniarily profitable. Here the conditions point to the use of the Woodbury method as the most suitable, as, the intaglio once obtained, the production is rapid and inexpensive, as is proved by the price at which such pictures are now obtainable. For landscape work, however, some form of photolithography appears to offer advantages not found in the two before mentioned, but this also requires a special press and delicate manipulation.

We now come to the class mentioned as "publishers." These may be classed as—1. Professional photographers who require to print large numbers of proofs, either portrait or landscape, and with whom we have dealt in the preceding paragraph. 2. Publishers of reproductions of works of art in half-tone or in line, or copies of maps, charts, &c. 3. Producers of book illustrations of every description. The two latter classes will, of course, be in a position to profitably employ the necessary machinery and apparatus for whatever process may be adopted, the process depending entirely upon the character of the work done. It is here that the capabilities of the photolithographic processes show most remarkably, as they are equally useful in the rendering of half-tone or pure line work, and, indeed, for any form of *fac-simile.* Where it is only necessary to reproduce subjects without half-tone in pure black and white the various photo-engraving processes will come into use; but *the* processes of the future for that class of work are undoubtedly the phototypographic methods, by means of which blocks in relief for printing in conjunction with type for book or magazine illustration can be produced.

We now quit the subject, having attempted to show to our readers in what the advantages of the different permanent printing processes consist; and can only express a hope that, during the present year, as much interest may be exhibited in the popularisation of such methods of printing in this country as has been the case during the past year upon the continent. Meanwhile we must express an opinion that for some purposes silver printing will still hold its ground for some time to come.

A PORTABLE SPIRIT LEVEL FOR THE CAMERA.

While Mr. Viles was explaining, at the last meeting of the London Photographic Society, his method of securing a true vertical position for the ground glass of his camera, and was exhibiting the instrument —a plumber's level—by which he effected his object, the idea occurred to us that, notwithstanding the undoubted efficiency of the method proposed, the great bulk and cumbrousness of the level itself would act as a fatal objection to its ever being generally employed.

Carrying out the idea of the plumber's level we have had, since that meeting, a small pocket level constructed which will be found satisfactory by those requiring the services of such an instrument, either for securing the horizontal levelling of the camera or the placing of the ground glass in a true vertical position. This last is a matter not quite so easily accomplished, when the camera has been much "tilted," as might be imagined, the unaided eye forming in the majority of cases a very inadequate means for effecting delicate adjustment. To prove this: let a camera having a lens including an angle of seventy or eighty degrees be inclined upwards when pointed towards a building, and let the swing-back be placed in as nearly a vertical position as can be determined by the unaided eye. If, now, the accuracy of the adjustment be ascertained by that most rigid of tests, the coincidence, in the camera, of the vertical lines of the building with the frame of the ground glass, it will be seen to what a great extent the slightest deviation from the perpendicular affects the correctness of the projection, the lines either converging or diverging according as the ground glass has been adjusted within or without the true vertical position.

The plumber's level is of an L shape, one of the limbs of the rectangle having a spirit level inserted in it, and the method of using it is to place the plain limb against the ground glass and swing it (the glass) backwards or forwards until the spirit in the level indicates that it is horizontal, when the other will be vertical. But, as we have said, such levels are large, and cannot be easily stored away in one's pocket.

The improvement which occurred to our mind when we witnessed Mr. Viles's experiments, and which we have had since carried into effect, consists in having a small glass tube nearly filled with spirit of wine, the length of this "level tube" being one and a-half inch. It is secured in a case of about two inches in length, and there is a slip of brass, the length of the case, which is hinged at one end of this case and opens out in a manner precisely similar to the blade of a penknife; when thus opened, it stands rigidly in the rectangular position. Nothing can so well convey the idea of this level as its comparison with a penknife.

The portable level here described possesses the twofold property of securing accuracy in either horizontal or vertical surfaces. When closed it forms a spirit level of the ordinary description; but when the folding slip of brass is opened it is only necessary to place that slip, or arm, against any vertical surface in order to ascertain whether it be really upright. It is exceedingly portable, its longitudinal dimensions not exceeding two inches.

MAGNESIUM: THE TRUE METHOD OF USING IT.

When magnesium was first introduced, and the wondrous actinic properties of the intense light emitted by this metal during combustion had been duly noted, prophecies were rife with respect to the part it would soon play in providing a substitute for daylight in photographic portraiture. Nor were such prophecies and anticipations indulged in without good reason, for the light is so exceedingly rich in those rays by which photographic action is produced that one can quite sympathise with the ecstatic exclamation of the old Edinburgh Professor who, when he first saw it, exclaimed that it was "bottled sunshine!—portable daylight!"

What was the cause of its failure? and wherein lies the true remedy for that failure? To these questions we shall attempt to give replies. But, first of all, let the reader imagine the depth and width of the gulf which separates two portraits, respectively A and B, in our possession. The former has a hard, patchy appearance, having only the highest of lights and the deepest of shadows, with an unpleasant and strained expression, as if the light had been much too strong for comfortable endurance on the part of the sitter; the latter is soft, delicate, and round, the modelling perfect, the expression pleasing, abounds in half-tones without being flat, and is vigorous without being hard. Yet both of these portraits were taken by the magnesium light.

The proper way in which to use the magnesium light in the production of portraits appears to be quite unknown, if a judgment on this subject is to be arrived at from such specimens as have been produced and such publication as has been made respecting the *modus operandi.* This consists in igniting the magnesium and throwing the emitted rays direct from the sitter, using a reflector or condenser, so as to secure the utilisation of all the light. To prevent the shadows from being too hard "cut" it was customary to move the light during the exposure; and in some instances the services of a second light were required during a definite period of the exposure to light up the shadows. Now, when this direct method of illumination comes to be properly examined, and the effects necessarily produced noted, it will be found that the chances of producing a natural, agreeable, and soft picture are on a par with those that would prevail were a sitter posed outside of the house and in the direct beams of a blazing summer sun.

The condition for perfect illumination of a sitter is a dominant light—not one, however, that falls upon him from a point of intense luminousness, but from a large mass, so that the intensity should be converted into quantity, to use an electrical simile. This exercises upon the sitter an effect similar to that exerted upon a landscape when it has been lighted by a bright sun in a blue sky, contrasted with the same scene when a large mass of white, silvery clouds have interposed themselves between the solar orb and the landscape.

The high lights and dark shadows have disappeared, giving place to a mellow softness, without any apparent degree of diminution in the general luminousness of the scene.

Reasoning from analogy it was not difficult to arrive at the conclusion that, if the use of magnesium for portraiture were ever to become general, a primary essential was that the *direct* rays of the flame be not allowed to fall upon the sitter at all, but that it be used solely for lighting up an artificial cloud of such form and dimensions, and in such a position, as shall ensure at once a powerful yet soft mass of light being radiated upon the sitter. Adopting this general principle as an experimental substratum we have based upon it a great variety of experiments, which have resulted in our being enabled to state that there is no kind of lighting in taking a portrait in a studio by means of sunlight that cannot in an equally effective manner be obtained by the ignition of magnesium. Our first experiments were made by seating a doll in a model studio, and illuminating it by such a light as was radiated from sheets of white paper of precisely the same proportions with respect to the sitter and the distance as was obtained from a measurement made of a studio in which work of the greatest excellence is effected. This "studio window"—for such did the artificial cloud in effect become—was strongly illuminated from the front, every expedient of which we are aware being employed to prevent any loss of light, nearly all of it being projected forward upon the "cloud." At first no light was allowed to fall upon the inanimate sitter but the dominant one, a curtain of black velvet effectually preventing the action of such diffused light as would otherwise conduce to the lighting up of the shadows. The sides of the studio were lined with paper of a pale blue colour similar to what is known as "blue-tinted" writing paper, and bit by bit this was laid bare by the withdrawal of the velvet curtain, the effect being that the shadows were all softly lighted.

Mechanicians know that many experiments which succeed well with model apparatus fail when they are made with apparatus of large dimensions; so in this case we had by dint of experiment succeeded perfectly on the small scale, and it now became necessary to carry it farther, by substituting for the doll a living sitter and making our radiating cloud and reflectors on a proportionate scale. After making a few alterations and modifications we eventually succeeded in obtaining negatives which not even the sharpest expert could declare had been obtained otherwise than by ordinary daylight in a well-constructed studio. The principal and general system is the same as that described; but, instead of having the sitter lighted by reflection from a smooth surface of paper, we found it better to use thin, close-grained linen or cambric made wet before being thus used. The light, too, was placed on the other side of the cambric, which thus acted as a diffuser of the luminous power. It is of the greatest importance that the fabric be made wet, the advantage of which will immediately be made apparent if a person immerse one half of his handkerchief in water, and then hold it up between the eye and a bright gaslight, comparing the light as seen through the wet with the dry half. Through the dry portion the flame will be distinctly visible; the wet portion precludes the possibility of seeing the flame itself, but becomes luminous throughout.

The whole secret of the successful application to portraiture of the magnesium light is comprised in the simple act of allowing the light to become intercepted by a radiator or diffuser before falling upon the sitter; and, unless this be done, it will be impossible to secure portraits by artificial light which will compare favourably with those taken by daylight in the studio.

ON THE STORING OF NEGATIVES.

There is probably no part of the work of a professional photographer more troublesome to manage, or on the proper management of which more depends, as the storing and registering of the constantly-accumulating quantity of *carte* negatives produced in the ordinary course of an extensive business; and, as this is the season at which accounts are generally balanced, and when alterations in the system of bookkeeping are adopted, a few hints on some of the methods we have recently had an opportunity of seeing practised may not be unseasonable.

Our attention was recently directed to the subject in consequence of seeing an advertisement from a firm having a considerable amount of business intimating an intention of destroying all negatives taken previous to 1870, and requesting such of their *clientèle* as desired their negatives to be preserved to give notice to that effect, so that arrangements might be made either for their continued preservation or sale to those whom they represented. We have been informed that, in reply to this announcement, some of those who corresponded with the firm in question claimed to possess a right to the negatives, and dared them to destroy them; others were quite willing to pay the price of the glass, and humorously suggested that the photographers would be gainers by the transaction, as they would save save the cost of labour and material in cleaning it; while others were reasonable enough to agree to pay amounts varying from ten to forty shillings for each negative. Not one, however, could be brought to see that they might in all fairness be expected to pay anything, no matter how trifling the sum, either in the shape of interest on the money invested in glass or for the care required and room occupied in the storage.

A little consideration will show that such a demand is by no means so unreasonable as was at first presumed. If we take the moderate average of ten negatives a day, that will give in three hundred working days three thousand plates, costing say twelve pounds, ten shillings, or sixty-two pounds, ten shillings in five years. This is a modest estimate, and considerably below the general average; and yet we see that at the end of five years interest on a considerable amount has to be provided for if we take into consideration house rent and necessary handling. There are some photographers who boast that they never destroy a negative, while others take a fit of cleaning off old negatives every dull day.

The kind of negatives kept and the length of time they are preserved will depend very much on the character of the business; but we may take it for granted that in the majority of cases all good *carte* negatives are kept indefinitely, and therefore the question is as to how best the fair conditions of preservation can be secured—economy of space, freedom from damp, protection from mechanical injury, and facility in finding a negative when required. The three first conditions, so far as we were able to ascertain on applying to several photographers, were in most cases easily secured although in very different ways; but in nearly every instance there was evidence that the accumulation had been much more rapid than was anticipated, and in consequence the original ideas had given way to various makeshifts. One house had, in the early days of *cartes de visite*, fitted up large cases with drawers, each of which was grooved like plate-boxes; but, after taking up almost every available inch of space in a large room, recourse was at last had to envelopes, and standing the negatives on end on open shelves in other parts of the premises. In another establishment the negatives were packed in parcels of twenties with blotting-paper between each, and wrapped in oiled paper; while a third had them arranged on end on shelves, without any protection at all.

The systems of registration were equally varied—some of them so complicated that the assistants found much difficulty in acquiring a knowledge of the system, and so troublesome that it was frequently omitted, thereby making it worse than no system at all; and others so incomplete that they might have been omitted without being missed. In one instance we saw an extended series of large volumes, each page containing thirty-two prints, and in this way a copy of every negative that had been printed could readily be found. Each volume had an index of names arranged alphabetically with reference to the page which contained the print, and below the print was written the date on which it was taken and directions as to the place where the negative could be found. While pointing out some of the supposed advantages of the system one of the partners quietly added that he did not know what they should do if the lady under whose charge the department had been for the last dozen years were to get married, as he was quite sure nobody but herself could find the negatives when required.

So far as we can judge from an examination of the various methods of storing and registration we have seen, the following, which

includes the best parts of several systems, will, we think, be found thoroughly efficient, the preservation being perfect and the registration so complete that, given the name of the sitter or the number of the negative, the latter may instantly be found. Each negative should have the number scratched on the film, and be then placed in a separate envelope, on which a corresponding number is written. For facility in selection this might be done with a broad-pointed pen or brush, with lampblack rubbed into a solution of shellac in ammonia or borax, which not only will not fade, as ordinary ink frequently does, in the laboratory, but will be made more easily seen in the dim light usual to the place where negatives are often stored. They should then be wrapped up in stout paper in bundles of twenty-five, and marked boldly from say "26 to 50," as the case may be. For proper registration two books should be kept, in one of which first the number, then the name, and lastly the date should be entered, the numbers, of course, running consecutively. In the other, which must be indexed, the names, alphabetically arranged, should be entered, followed by the number of the negative and date. Such a method may be systematically carried out by devoting a few minutes to it each day, but with a considerable saving of time and temper to all concerned.

To make the system more complete, or as nearly so as possible, we would strongly recommend the keeping, in addition to the two books mentioned, of one such as has been already noticed, in which is pasted a copy of every negative that is printed. The advantages of such a record are so obvious that we are certain it only requires a little consideration to ensure its adoption.

During last year we had the pleasure on two or three occasions to publish the result of Mr. H. J. Newton's experiments in connection with emulsions, and we also reprinted the strictures of the London correspondent of the *Photographic Times* thereon. Since that time a further discussion appears to have taken place between Mr. Newton and his critic, and in another column we, this week, publish the former gentleman's latest reply. From what we are able to glean of the matter it appears that there exists a slight misapprehension on the part of the critic as to the real claims made by Mr. Newton in connection with his formula. The question is not whether Mr. Newton or Mr. Stillman be the originator of the idea of preparing an emulsion with excess of silver to be afterwards neutralised by the addition of further soluble haloid; probably neither can claim that. The novelty in Mr. Newton's formula lies in the employment of an excess of a soluble chloride instead of bromide. The possible advantages of this method were first shadowed forth by the late Mr. Sutton, and more fully treated, subsequently, by Mr. W. Robinson, of Liverpool. The distinction which Mr. Newton makes between "fog restrainers" and restrainers of development is perfectly just, the advantage claimed for the chloride resting in the fact that it prevents fog without increasing the exposure to the same extent as bromide. But though, so far, we agree with Mr. Newton, we must take exception to his statement that "silver unites with bromine with much less vigour than with chlorine or iodine." We thought it had been proved, and was now generally accepted, that bromine took the intermediate place between iodine and chlorine, the former possessing the greatest affinity for silver. Mr. Newton's closing remarks relative to Mr. Hoyt's experiments lead us to believe that he is losing sight of Mr. M. Carey Lea's process.

ROGER LAURENT'S PHOTO-MECHANICAL PRINTING PROCESS.

Preparation of the Gelatine Paper for the Printing Plate.—The paper should be good and free from all impurities, flexible, equal, smooth, and firm, so as to resist the action of the water. It is used in leaves the size of half a sheet of letter paper. The gelatine should be of the best quality, clean, white, transparent, and firm, like that used by confectioners.

One hundred and thirty grammes of gelatine are allowed to swell for twelve hours in one litre of pure water, after which it is completely dissolved in a bath of warm water, and afterwards filtered through a piece of fine linen to remove any impurities. The filtered, still-warm gelatine is poured into a four-cornered porcelain or metal dish of the same size and shape as the paper to be treated; while the latter is being gelatinised the dish must be kept warm by being placed in a sand or water bath, so as to make the gelatine adhere well to the paper. The gelatine should not, however, be made too hot nor nearly boiling, as that would be apt to cause air-bubbles; on the other hand, if the dissolved gelatine be too cold, there will be too thick a film upon the paper, and the delicacy of the impression will suffer.

The dissolved gelatine should be beaten to a froth before being used, and any skin that is formed removed. The paper is then laid upon the gelatine like albumenised paper upon the silver bath. Take it between the finger and thumb by the two opposite corners and lay it gently down, so that the centre of the sheet shall first come in contact with the gelatine; thus the formation of air-bubbles and the wetting of the wrong side of the sheet with gelatine are carefully avoided.

The sheet is allowed to swim for about thirty seconds; it is then taken hold of by one corner and raised carefully but quickly with one pull quite out of the dish—by no means an easy operation. The paper is allowed to drip for a few moments into the bath, and is then fastened up vertically by one edge and left to dry. Before laying a fresh sheet of paper in the bath the gelatine should be skimmed. When the gelatine has stiffened on the paper its quality can be tested; if it be of good quality the thick band of gelatine which has collected at the lower edge of the paper should be elastic and resist the pressure of the finger without breaking. The gelatinous film is thicker at the lower end of the sheet than at the upper end—a circumstance of which one can take advantage just as he wishes the parts of the picture to be developed upon it to show more or less delicacy. Thick paper takes on a thicker coating of gelatine than thin paper. This should be remembered, as the strength of the gelatine film depends upon it. When the gelatinised sheets are quite dry they should be laid between the leaves of a book, as a precaution against creases or cracks. When protected from damp these sheets are exceedingly durable, and may be sensitised with bichromate of potash as required.

Sensitising of the Gelatine Paper.—The paper is allowed to swim for thirty seconds upon a three-per-cent. solution of bichromate of potash in water, made by dissolving fifteen grammes of bichromate of potash in half-a-litre of water. This solution must always be kept at the same strength. The sensitising is done in the same way as the gelatinising described above; but if on taking up the paper air-bubbles appear on its surface it may be replaced on the bath again, which is not possible with the gelatine bath. After being sensitised the paper is hung up in a dark room and left to dry for, at least, twenty-four hours. The following proceeding is to be recommended:—Lay a piece of clean linen, saturated with the solution of bichromate, either singly or twofold, upon the gelatinised sheet until the fluid has passed over and damped its surface, then remove the linen and lay the paper, with the gelatine side lowermost, upon a perfectly-clean glass plate upon which a little of the chromic solution was previously poured, then let it dry in the dark. When the paper is at last removed from the glass plate it is as smooth and even as if it were glass itself. If it do not come freely from the glass, then the latter could not have been properly clean.

While the sheet is wet it is not sensitive to light, but as soon as it is quite dry it must be carefully protected from the light. The paper should not be used before it is completely dry, as the gelatine film is apt to peel off later on. The sensitised paper keeps but a week at the most, therefore it should not be sensitised long before it is wanted for use. The best results are obtained with a paper prepared with fresh, dissolved gelatine, sensitised with a fresh solution of bichromate of potash, and used about twenty-four hours after it is quite dry.

The chromic bath should only be used two or three times, and must be poured out after being in use a week or so.

Exposure of the Paper Under the Negative.—If paper prepared in the manner described above be exposed to the light in a printing-frame under a negative the parts upon which the light falls lose their property of swelling in water, and take on fatty colours easily, while those parts upon which no light fell still absorb the water and reject the colour. Bad or indifferent negatives should not be used; they should be perfectly sharp and clean, thick in the high lights, and clear and transparent in the shadows. This is absolutely necessary. Diffused light is most suitable. If copied in direct sunlight a sheet of transparent paper or a plate of ground glass must be laid over the printing-frame. The copying process must be carefully watched, and from time to time the print should be inspected until

all the details of the picture appear of a beautiful golden sepia colour. The lighting must then be stopped, otherwise the whole surface of the paper would take on the printing colour. If the lighting were too short the finer details would not take on the necessary amount of colour. If the paper will not take on the colour over its whole surface after a proper exposure the gelatine film is too thin, and for the next impression the lower end of the paper should be used, as the film is thicker there. After the exposure one must see that the wrong side of the paper is not disturbed. Above all, one should take care that the paper lies close to the negative when in the printing-frame, and that all dust is previously removed from it, otherwise the print will be flat and bad. Round the negative a margin of paper about half-an-inch wide should be left, for reasons to be given hereafter.

Further Treatment of the Paper before the Application of the Inks.—After the exposure the sheet may be kept for about twenty-four hours protected from the light between the leaves of a book, but not longer, on account of what has been called the "continuating" action of the light. The paper must then be plunged into cold water in order to soak the gelatine and remove all the remaining soluble chromate, for which purpose the water should be two or three times renewed. This washing lasts some ten to fifteen minutes. The parts not affected by the light suck up the water and swell out, so that the drawing stands out on the paper as if it were finely engraved. When the paper has lost its yellow colour it is taken out of the water and laid upon a thin glass plate, picture side uppermost. Should there be any blisters—which can easily be ascertained by looking through the glass—they can be pressed out with the open hand. The pressure of the atmosphere is sufficient to make the paper adhere and lie quite flat, which is indispensable to its taking on the colour. A sheet of blotting-paper or a very thin rag is pressed upon the picture to remove all superfluous moisture, because, though the gelatine film should be moist, it must not be wet. The drawing can now be clearly and distinctly seen upon the paper, and the most difficult operation of all follows, namely—

The Inking.—Some common lithographic ink is mixed with a little linseed varnish, and is ground down on a thick glass plate by a glass rubber. The inking is done with the finger. Dip the point of the finger once or twice into the colour, spread out upon the glass plate, and then rub it over the gelatinised paper, which, as was said before, is still damp though there is no drop of water upon it. Only a little colour should be taken up at a time, and the finger moved with a slight pressure over the whole surface of the paper until it is covered with a thin coating of the colour; the finger is then washed and passed again over the paper, always rubbing in the same direction across the lines of the drawing. In this way the ink is removed from the swollen parts of the gelatine, while it still adheres to the lines between; that is, always supposing the exposure was of the required length. A wet sponge is then passed over the sheet in order to clean the whites—that is, the parts of the gelatine unaffected by the light—as much as possible. If the ink be not removable from these places then the exposure must have been too long or the paper too old. It is well to be as quick as possible over this process, because the gelatine film should be kept damp. If it become dry a wet sponge must be passed over it, and the superfluous fluid removed again with a piece of blotting-paper. If, when examined through a magnifying-glass, the drawing appear clear and sharp and the whites clean the sheet is ready for the press. That used by Laurent is very simple. It consists of two iron rollers which run one above the other, as in a burnishing-machine. They are ten or twelve centimetres in diameter and thirty centimetres long, enclosed in a surface covering of india-rubber one centimetre thick. It is driven by hand, by means of a crank. Before and behind them, at the height where they touch each other, a table is placed for the plates that pass through between the rollers.

(To be concluded in our next.)

THE COFFEE PROCESS APPLIED TO PAPER PRINTS.

We all know the pleasing result obtained by toning down the margin of a vignetted portrait, leaving the only pure white in the picture upon the high lights of the face and bust. The process I now suggest is applicable to large portraits on plain paper, and forms the means by which any photographer can with little trouble produce artistic and pleasing results and much enhance the effect of relief in the picture.

In the first place, prepare a good vignette on plain paper of the portrait to be improved; tone, fix, wash, and dry in the usual way; lay the proof so prepared, face up, on any hard, smooth surface; then with a brush paint over with albumen the portions of the subject intended to be left white, and let dry. When quite hard a piece of wax or paraffine scraped into a convenient shape must be carefully and gently rubbed over the albumenised portions; now pin the picture on a drawing-board placed in an inclined position—the upper part to be most raised; then with a large soft brush evenly moisten the whole surface with water, care being taken that no part is missed, as the success of the operation depends on the application of a flat tint. Finger marks will occasionally make the paper more repellent of moisture where they occur, so in this case such spots must be wetted until they absorb moisture equally with the other portions. This having been successfully accomplished, allow the proof to get just surface dry, and then with a brush, commencing at the higher and upper portion of the subject, wash over the whole with an infusion of coffee of a strength sufficient to impart a colour about the same as that known as "India tint." The depth of tint is, of course, at the discretion of the artist, and may be lighter or darker according to circumstances.

In giving this wash it may be as well to miss covering the head and bust of the figure; the moist state of the paper will prevent hard edges being formed.

Let the picture dry, and if on examination it be not considered sufficiently deep in colour repeat the process, not omitting to moisten it with water before the application of the coffee; but on no account attempt to alter the tint until the previous wash has dried, or an uneven ground will in all probability result.

The tinting being satisfactorily accomplished, thoroughly dry, to set the colour; now place it in a pan of warm water for a few minutes, and then, with a soft sponge, gently rub off the albumen and wax, remove from the water, and dry between folds of blotting-paper. It can now be mounted and finished with black pigment or left as it is. A few touches of dark colour corresponding with the colour of the photograph will frequently be all that is required to make a very presentable picture. EDWARD DUNMORE.

INTENSIFICATION AFTER FIXING.

[A communication to the Photographic Section of the American Institute.]

It has been one of the most difficult things I have attempted to do to intensify a dry plate after it was fixed without fogging. I have succeeded, however, in doing it perfectly. I make three stock solutions.

No. 1.

Water	3 ounces.
Iodine	20 grains.

Add sufficient iodide of ammonia to dissolve the iodine in the water. When the iodine is dissolved in that way add half-an-ounce of hydrochloric acid.

No. 2.

Water	6 ounces.
Citric acid	30 grains.
Nitrate of silver	30 „

No. 3.

Water	6 ounces.
Protosulphate of iron	30 grains.
Citric acid	30 „

After the plate is fixed and washed—I will speak now of the 8 × 10 plate—take about three-quarters of an ounce of water and put eight or ten drops of No. 1 into it—enough to give it a good orange colour—and flow over the plate, off and on, until it converts a trace of the bromide into an iodide (an iodide will decompose a bromide of silver), and a slight veil appears on the surface, which will require from thirty to fifty seconds.

Now take No. 3 and pour into a wide-mouthed vial about three-quarters of an ounce.

From No. 2 the (silver solution) pour over the plate sufficient to flow all over without much excess, and keep it moving so that the action is uniform from one end of the plate to the other from thirty to forty seconds. Then pour it off into the vial containing No. 3 (the iron solution), and flow with the iron, off and on, and the intensity will go on to any degree, and be perfectly clear and brilliant.

After you have fixed your plates you can let them dry, and when you want to intensify them you have only to wet them and proceed as I have described. It operates just as well after they are dry as before. H. J. NEWTON.

NOTES ON PASSING EVENTS.

By a Peripatetic Photographer.

How time slips round, to be sure! It seems only like a few weeks since I, at the commencement of the year 1875, indulged in

what some might term a few commonplaces peculiar to the season, and spoke of the passing away of certain readers and the probability of more following. Several *have* followed, some of whom I regret very much, Mr. Sutton occupying a chief place among those most regretted. Well, as I have said on a former occasion, "mortality is stamped on all."

Surely the publisher introduced as a typical man and referred to in a leading article in last week's Journal, and who is said to be "well acquainted" with what has been done to render photography available in book illustration, cannot have stored his knowledge on very available or accessible shelves, or the extent of his acquaintance with this department of photography is not so great as we are expected to believe. The special kind of knowledge, or of application, desiderated by this publisher is already possessed by hundreds of photographers, and several large and flourishing commercial enterprises exist for giving practical effect to that knowledge. Such is the state of perfection to which the requirements of publishers, as respects illustration, has been brought that a statement I once heard a printer make is not very far from being a literal fact. His statement was that you might toss in a drawing at one end of a machine, and it would come out at the other end enlarged or reduced to any scale, and in the form of either a surface block for typo-printing, an engraved copper-plate, or a lithographic stone. Allowing for exaggeration of language, this indicates pretty clearly what is done every day in several establishments.

Some substances there are which will either kill or cure, according to circumstances. Among these powdered talc is entitled to a place—not, however, for its hygienic or toxicological effects upon the human system, but upon that nearly equally mysterious system—the collodion negative. If it be found desirable to remove a collodion film from a glass plate with facility it has long since been recommended that the plate should receive a preliminary dusting over with powdered talc, which is then wiped off and the collodion applied; if, on the contrary, it be desired that perfect adhesion of the collodion take place treat the plate in a precisely similar manner—so, at any rate, says a foreign writer on this subject; and a speaker at the last meeting of the London Photographic Society shows that it also acts as a preventive of the film splitting. It is not difficult to account for this latter property when we come to consider its nature. But I ought to premise that talc is of a twofold nature—one kind transparent, foliated, and flexible, the kind that is used occasionally, and may be used to a much greater extent, for taking negatives upon; the other is of a different nature, and known respectively as "French chalk," "soapstone," and "steatite." This mineral has certainly a very saponaceous feel, and possesses the singular property of imparting its unctuosity to glass to such an extent that if writing be performed upon the clean and polished surface of a plate of glass, and friction be then resorted to by rubbing with a cloth, the writing will still become visible when breathed upon. Those who desire to obtain a quantity of this magnesian mineral for experimental purposes can do so on application at the nearest boot and shoe establishment, it being the "boot powder" used by that fraternity.

After a previous existence for some time in this country I observe that the method of focussing by having the lens tube to *screw* through the jacket, instead of its being propelled by a rack and pinion, has now been introduced into France by M. Hermagis. It is, without doubt, a convenient method, and one which I have used for more than twelve years, the special maker being Mr. Grubb. It is worth while observing here that Mr. Grubb introduced this form of adjustment in the same year and month as Waterhouse introduced the well-known diaphragm associated with his name—that is, in July, 1858. The outer end of the tube is surrounded by a graduated ring, and, by turning the tube through one or more divisions, a definite and measured degree of motion is most easily obtained. The threads of the screw are flat, shallow, and very wide apart. With all deference to the opinion of the ingenious French optician named, I think the photometer that has recently been introduced by him is calculated to prove rather more ornamental than practically useful. It consists of a wedge of yellow glass having graduations on one side, and the method of using it is to superimpose it upon a slip of sensitive paper, allowing it to be exposed to the light for one minute and then "reading off" the luminous impression that has been made. I think that M. Hermagis overrates the difficulty of obtaining coloured films of collodion or gelatine of uniform quality. When a sheet of either of these substances stained with any non-actinic, durable pigment is cut up into slips and attached in progressive layers to a thin slip of glass, each series being numbered, a useful little pocket actinometer is obtained, capable of affording an excellent idea of the actinic intensity of the light. Probably the best actinometer in existence for real, practical work is that which was introduced by Mr. H. J. Burton, and a description of which was given in this Journal last summer.

I learn, with some regret, of the departure of Mr. J. W. Gough for India. That gentleman has been one of the most indefatigable workers with, and experimentalists in, the collodio-bromide process; and the pages of the Journal have been enriched by many contributions from him both on this subject and on that of perspective, as well as on other topics more or less cognate to his profession—that of an architect. The friendly feelings entertained towards him—which found an outcome in a *soirée* given, and a presentation made, to him by members of the West Riding of Yorkshire Photographic Society, of which he was President—are shared by every one; and whether for the next few years he be engaged in aiding in the erection of palaces for Eastern rajahs, or in prospecting the country with camera and dry plates, he carries with him the best wishes of all his friends.

(To be continued.)

PRINTING DEPARTMENT.

For washing the prints and thoroughly expelling the hyposulphite of soda I think the following is the most efficient and simplest piece of apparatus that could be got:—

Buy a large washing tub, and make two holes in it—one at the side and the other nearer the bottom, wide enough to admit a pipe of two inches diameter. Next obtain a smaller-sized tub to go inside of this one, and leave a good clear space between the two. In this smaller tub make four holes at intervals in the side, about a foot and a-half from the bottom, so as to have a sufficient depth of water. Now procure two pieces of lead piping—one about three feet long, to carry off the water from the large tub, and the other eight feet long, to conduct the water into the small one where the prints will be placed. Insert the short piece of pipe into the hole near the bottom of the large tub. Take the other pipe, pass it through the hole in the side into the small one, bend it, and make it describe a circle, so as to lie all round at the bottom, and fix by means of a few holdfasts, to prevent it rising and obstructing the spinning of the prints. Force the end of the pipe which is inside the small tub close together, to cause a stronger rush of water. Then take a bradawl and make four small apertures in the circle of the pipe, to send the current upwards. Having done this, and closed up any apertures in the large tub which might leak, take your machine and place it on a bench or table near to and on a level with the sink, so that the pipe inserted in the bottom hole of the large tub rests in the sink, to drain off the water. Purchase some gutta-percha piping, and fix one end of it on to the pipe for conducting the water, and the other end on to the tap for supplying the water.

Put in the prints, turn on the water, and you will see in a minute or so the prints rushing round and turning upside down in fine style. As the water rises in the small tub it flows through the holes into the large one, and from thence to the sink by means of the drainage pipe.

Sometimes the prints stick to the holes, and prevent the escape of the water, so it is better to have four other holes bored a foot further up.

Five or six hours' washing in a machine like this is quite enough. It can be kept in the workroom, if you have accommodation, where your eye can be always on it; but there is no danger of overflows if these instructions have been followed, and the apertures and drainage-pipe made large enough.

Lindsay Howie.

FOREIGN NOTES AND NEWS.

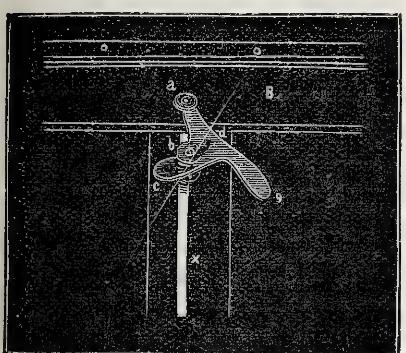
The Autotype Co. in Germany. — New Work on Art. — Introduction of Photography into the Curriculum of the Polytechnic at Pesth.—American Focussing Arrangement.—Dauthendey's Illuminator.—Count de Courten and Small-Pox Eruptions.

We understand that the Autotype Company (Messrs. Spencer, Sawyer, Bird, and Co.) have appointed Mr. Romain Talbot, of Berlin, their sole agent in Germany.

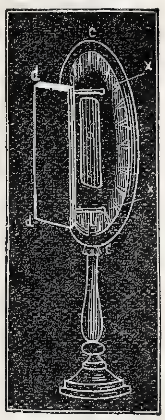
Herr Gottfried Kinkel, one of the pioneers of photography in Germany, has just written a little book called *Mosaics of Art History*. How well qualified Herr Kinkel is to speak on art-matters is well known, and, were it not, one has only to mention that Lübke was his pupil to gain him a hearing. Herr Kinkel devotes a chapter to Stonehenge.

The professor of chemistry at the Polytechnic at Pesth has arranged to lecture upon the theory and application of photography twice a week, and a class for practical photography has been formed; the attendance last year numbered thirty-five. This is the third Polytechnic in Germany into which the study of photography has been introduced, the two others being the Polytechnic at Dresden and the Industrial Academy at Berlin. The proposal to introduce it into the curriculum of the technical high schools of Aix la Chapelle, Karlsruhe, and Stuttgart seems to be abandoned for the present.

The current number of the *Mittheilungen* contains, by way of an appendix to the report of the meeting of the Berlin Photographic Society published in the former number, an illustrated description of the Scovill Company's focussing arrangement and Dauthendey's illuminator. Both of these instruments were, we believe, exhibited at the late exhibition at Brussels. The focusser is used as follows:—B is the foot of the movable back of the camera with the ground glass. S the foot-board with the slit x, in which the screw b runs. On B the screw a is placed, to which the excentric d with the arc $c\,d$ is drawn, the centre of which is beyond a. If, after fastening the screw b, the excentric be pulled by the handle g the focussing-glass will be moved backwards and forwards very quickly and easily.



Focussing Arrangement.



Dauthendey's Illuminator.

Dauthendey's illuminator consists of a large wooden slide with a four-cornered cabinet-sized opening. The back of the slide, which is visible in the illustration, is pasted over with rose-coloured paper, and has at the edge three-cornered coloured pieces of glass. The latter are, however, not necessary. Behind the slide four rods are placed, of which only two, $x\ x$, are visible in the accompanying figure, and a board $d\ d$, the inner side of which is grooved so as to allow a cabinet picture to be pushed down as far as o. This contrivance being placed with the back $d\ d$ against a window the picture is only lighted by the light reflected from the bright back wall of the slide, which produces a peculiar effect, reminding one of pictures upon opal glass.

M. le Comte Ludovico de Courten has thought it worth while to devote an article in the *Moniteur* to the consideration of a sensational case mentioned by the London correspondent of that journal. An instance is reported to have occurred where the eruption in a case of small-pox was rendered visible in the photographic image twenty-four hours previous to its appearance to the eye. M. de Courten, after remarking that many journalists have treated the matter as improbable, proceeds to say that there is really nothing astonishing about it. In order, he says, that the variolic spots should impress themselves upon the sensitive film it is absolutely necessary that they should possess a colour varying from the general tone of the skin, though, perhaps, invisible to the unassisted eye. This he describes as an effect of actinism. He further remarks that it is not stated whether the spots are rendered in the negative as black or white—in the former of which cases they might be supposed to have a reddish, in the latter a violet, tinge. In such doubtful instances M. le Comte recommends the use of a coloured glass which stops all the rays of the spectrum below the blue. This will render visible, it is stated, any such invisible indications as those above mentioned, as well as others which M. de Courten mentions.

ON BROMIDE EMULSIONS.

[A communication to the Photographic Section of the American Institute.]

On the 12th of October, 1874, I made two pounds of bromide emulsion. On the third day after it worked splendidly, some of the results being shown last fall before this Society and at a meeting of the Brooklyn Photographic Art Association. I tried the emulsion almost every day until the latter part of December, 1874, when, having to go south for about a year, I thought I would test its keeping qualities. So far it was all right.

I divided the emulsion into two equal portions, one half being labelled with date and put away from the light, the other half I washed in the following manner:—Taking a deep porcelain dish, half filled with distilled water in the dark room, I poured the bromide emulsion into it. The emulsion soon clotted up. After stirring it well with a glass rod, draining the water off, and washing again in a few changes of water and draining, I squeezed all the water out, broke up the cotton, and set it aside to dry. When dry I mixed with equal portions of ether and alcohol, so as to give a good, flowing film; after filtering I found it to work quick, clean, and brilliant. This bottle I also put away.

On my return, after an absence of twelve months, I found the unwashed emulsion on trial to fog a little, and not so sensitive. In the bottle of washed emulsion I found a perfectly clear liquid with a fine, white sediment at the bottom. Shaking it up well, and after allowing the bubbles to subside, I tried a plate, and found it had lost none of its original good qualities and developed free from any kind of fog.

The addition of a few drops to the ounce of emulsion of an alcoholic solution of hops, boneset, liquorice, or any organic matter soluble in alcohol which is also soluble in water, will act as a preservative on the plates, but in a week's time it seems to affect the emulsion in the stock bottle.

The emulsion was made in the following manner:—

Ether	8 ounces.
Alcohol	6 ,,
Bromide of ammonia...........................	112 grains.
Anthony's soluble cotton No. 1	112 ,,

After a good shaking I added, in two ounces of hot alcohol, 240 grains of nitrate of silver, shaking up well, and the next day I added a quarter of an ounce of iodide solution (alcohol one ounce, iodide of ammonia fifty grains), shaking well and filtering a little before trying a plate. If it showed any sign of fog I added a few drops more of the iodide solution. This will bring the emulsion all right. If there be too much iodide in it a fine granular deposit will be seen on the sides of the bottle. A drop or two of silver in alcohol will take this all up.

T. C. Roche.

EMULSIONS.

We have been favoured by Mr. H. J. Newton with an early copy of his reply to the allegations of the London correspondent of the *Photographic Times*, the nature of which will be understood as the reader advances:—

He labours very hard to prove by *theory* that some well-established facts are no facts at all. Theory and the ability to theorise lead to experiments which demonstrate the correctness or error of the theory; but when the theorist disregards facts or creates them by an exercise of the imagination he turns science into romance. He commences his article by saying that "Mr. Newton replies rather contemptuously to my statement." I plead "not guilty" to the indictment. There is not one word or sentence in my reply to his article in your July number that contains the least element of contempt. His mental optics must be sadly out of focus when they present such distorted visions to his perceptive faculties. It may be possible that he occupies such an exalted position in his own imagination that it is the height of contempt for any one to call in question the correctness of his theorising. I am really at a loss to account for such a statement in any other way. We presume he means to be perfectly fair and just in his criticisms, and if we are unable to reconcile all he has written in harmony with this presumption we will try and be charitable enough to attribute what may seem unfair to other causes than design. In his first article, in your July number, page 172, he says in substance that my process is not new. I have been anticipated by "Mr. Stillman, who showed in The British Journal of Photography, two years or more ago, that an emulsion kept for weeks under as strong an action of nitrate of silver as possible was made to work clearly by the addition of enough bromide to convert all the silver, and leave an excess of about two grains per ounce of bromide. He found that by this treatment the emulsion improves in rapidity during about six weeks."

Now, I wish to call particular attention to the use which he makes of the above facts. He does not appear to think that the addition to the emulsion, previously, by Mr. Stillman of nitric acid made any difference with the result, as that fact is merely alluded to without comment. In his letter in your October number, page 234, he makes an effort to prove that a chloride is more powerful as a restrainer than bromide, and he does it in this way. He says:—"Mr. Gordon, after some experiments with emulsions with excess of silver, declared to me that bromide alone would not recover an emulsion which had begun to fog. If this be so, it follows that the chloride is more powerful as a restrainer than a bromide." Now, I submit that these two quotations from his two letters

can hardly be used to prove the same thing; either I have not been anticipated by Mr. Stillman, and he knew it when he was penning the article, or he has learned something since. Again: in his article in your October number, page 234, he says:—"If we prepare two emulsions, similar in every respect, except that one of them shall have one grain per ounce excess of silver and the other one-half grain bromide of ammonium, wash the plates as thoroughly as you please in distilled water, and the difference between them will be about that between one minute and two." Again: in the same article, on page 235, he says:—"I have added as much as ten grains of a bromide per ounce to an emulsion after two or three days' action of an excess of silver, and found *no trace or effect of it* after a minute's washing under the tap." The italics are mine. I will leave these quotations without comment, trusting to the intelligence of your readers to give them their full value, remarking only that the value of the testimony of a witness is determined by a few simple rules. If there be an unmistakable exhibition of animus and bias on the part of the witness the value of his testimony is materially reduced. He uses Mr. Stillman's experiments to prove that my process was not new; and Mr. Gordon's, which contradict Mr. Stillman's, to prove that a chloride is a more powerful restrainer than a bromide. This, to me, is a novel way of proving a point or maintaining a position.

If your correspondent had spent as much time in experimenting as he has in writing the two articles under consideration he, no doubt, would have written differently.

The main question, however, is that involved in his assertions that the chloride washed from the film and left in the preservative materially impairs the sensitiveness of the plate, and that a chloride is an equivalent for a bromide. He has, it appears to me, expended much useless labour to prove that an excess of bromide in an emulsion materially lessens its sensitiveness. So far as I know there has been no dispute in reference to that fact, and if your correspondent will refer to the last sentence of the second paragraph of my first article—published, I think, in the May number of the *Photographic Times*—he will not only find that fact recognised, but given as a reason why I used a chloride instead. Your correspondent, on page 234 of the October number of the *Times*, says:—"But why Mr. Newton should assert that the action of a chloride differs from that of a bromide I cannot understand. I have never made any experiments to prove the exact difference between the restraining power of a bromide and a chloride."

Again: on page 235 he says:—"What Mr. Newton means, then, by saying that the action of a bromide and of a chloride is not equivalent I do not understand." I meant exactly what I said, and I assert again that a bromide is not the equivalent of a chloride in any one thing. They are similar in some respects, for they both unite with most of the metals with avidity; bromine, however, unites with silver with less avidity than with most of the metals, and with much less than chlorine. A plate coated with a collodion containing eight grains to the ounce of a bromide cannot be sensitised in a nitrate of silver bath of the strength of forty-five grains to the ounce. It would require a bath from sixty to eighty grains strong, and in such a bath at least fifteen minutes. So far from *a* bromide being an equivalent for *a* chloride there is not one bromide which is an equivalent for another bromide, or one chloride which is an equivalent for another chloride. In my experiments I went through with most of the soluble bromides to determine their action in emulsion. I found none equivalent to the bromide of cadmium. I also tried most of the soluble chlorides, and found none which answered my purposes so well as the chlorides of calcium and cobalt. To speak of the action of *a* chloride or *a* bromide is putting it in about as indefinite a form as possible. When I spoke of the effects of a chloride I had special reference to the chlorides which I had previously named as having adopted. Some of the chlorides will not only seriously affect the sensitiveness of the film but entirely destroy it, while other chlorides will increase the sensitiveness of the plate entirely beyond control. A very weak solution of the chloride of mercury flowed over the emulsion plate, after washing in clean water, will entirely destroy the sensitiveness of the film. A weak solution of chloride of platinum in a slightly-acid condition will increase the sensitiveness, while the same solution, slightly alkaline, will entirely destroy sensitiveness.

One drop of an eight-grain solution of the chloride of gold in an ounce of water flowed over the emulsion plate after washing will increase the sensitiveness beyond control; but if one drop of the gold solution be put into twelve ounces of water, and the plate treated as before, the sensitiveness will be increased about ten times. The image, however, will be thin and inclined to fog. This condition can be improved by adding to the twelve ounces of water containing the gold one grain of the iodide of ammonium. These examples are, perhaps, sufficient to show the different effects of different chlorides. Your correspondent, in the first paragraph of his letter in the October number of the *Times*, adopts my figures, and puts it as if I admitted that the quantity named to the square inch did diminish the sensitiveness of the film. I wish it to be distinctly understood that I admitted nothing of the kind. I denied the effect claimed by your correspondent, and still insist that my position was correct in reference to the chlorides which I had named as having adopted. I "*supposed*" the case for the purpose of illustrating with figures the small quantity of chloride which could in any event remain on the finished plate. In doing this I took the extreme of the quantity of chloride which I had recommended, while half the quantity will answer every purpose, and that can again be further reduced by adding silver after the emulsion has attained a good working condition, so that only one and a-half grain to four ounces remains free.

If any one interested will wash an emulsion plate in pure water, and flow one half of it with a two-grain solution of chloride of calcium, expose and develope, there will not be the slightest difference perceptible between the two halves of the plate. This simple experiment ought to be conclusive as to the effect of this particular chloride. Again: prepare the plate in my preservative—one that has been used for a long time—if you choose; wash one half of it, expose wet, and there will not be the slightest mark to indicate how far the washing went. If, however, a plate so prepared be dried and then exposed, it will be found that the washed part will require *at least double* the exposure to obtain the same effect of light as that part which remained unwashed. If I rightly understand the position of your correspondent in reference to what he terms a "restraining agent," it is that an agent which restrains the action of the developer also restrains the action of light on the sensitive film. I infer this from the manner in which he uses the term. If this be his position I am confident it is erroneous. Take, for instance, the use of nitric acid in the negative bath. It is well known that nitric, acetic, and sulphuric acids act as restrainers in the developer, but at the present time nitric acid in the negative bath is used to increase sensitiveness in the prepared collodion plate.

One of our most successful photographers of this city—one who has unsurpassed success in making negatives of children—informed me that in making up a nitrate of silver bath he always put one and a-half ounce of nitric acid to a three-gallon bath, and if it did not work quickly enough he added more. Mr. Black, of Boston, who stands very high in the profession, says, in one of his public statements, that he frequently uses as much as two ounces of nitric acid to a gallon of nitrate of silver bath, and claims that he gets increased sensitiveness by so doing. These examples will be sufficient to illustrate my position that an agent which restrains the action of the developer does not necessarily restrain the action of light on the sensitive plate.

In reference to the chlorides which I have designated as being used in my emulsions, I deem it pure assumption on the part of your correspondent when he claims that they are in any sense restraining agents. They certainly are not in the developer. I used, last spring, twenty grains of chloride of calcium to the ounce of developer without any perceptible effect. It does not follow as a matter of course, as your correspondent argues, that a chloride is a restraining agent because it restores a foggy emulsion, and that it is a more powerful restraining agent than a bromide because a bromide will not do the same thing in as marked and positive a manner. Silver unites with bromine with much less vigour than with chlorine or iodine; there appears also to be considerable fickleness in the union of bromine with silver. When, therefore, you put a bromine into an emulsion containing an excess of silver in a foggy condition you may or may not restore it. I have restored such emulsions by adding a bromide collodion, but it was always done at the expense of the sensitiveness to a marked degree. A chloride unites with the silver much more vigorously than a bromide, is, therefore, much more certain in results, and *does not impair the sensitiveness* of the emulsion.

Mr. D. C. Chapman stated, at the last meeting of the Photographic Section of the American Institute, that he had successfully used a very old bromo-iodised collodion for the same purpose. I have in my experiments used some of the iodides and also pure iodine, but the results were far from as satisfactory as those obtained with a chloride. An iodine will decompose the bromide of silver. Wash an emulsion plate and flow one half of it with a solution of two grains of iodide of ammonia in one ounce of water for thirty seconds. You will have converted the part so flowed into an iodide of silver with the iodine in excess, and you will find it as insensitive to light, photographically speaking, as the paper on which I am writing. If, however, you take one grain of the iodide in sixteen ounces of water and treat as before you will find you have materially increased the sensitiveness of that part of the film. Before bringing this article to a close I have a word to say about one and, as far as stated, only experiment of your correspondent with a chloride, and that was with the chloride of sodium, which he says materially impaired the sensitiveness of the plate. As he does not give the strength of the chloride solution I infer from the effect obtained that it was a strong one. As a strong solution of chloride of sodium is a solvent of bromide, as well as the chloride of silver, the result obtained was inevitable.

In my first article on emulsions I stated that I proposed to give only facts obtained without theorising, that my experiments were incomplete and would be continued, and the results given to the photographic public. I did not suppose then, neither do I now, that ultimate perfection has been reached in this process. When, however, we can produce a satisfactory emulsion of perfect keeping qualities with the preservative in combination with it, so that we have only to flow the plate and let it dry, we shall have approximated very near to perfection. This has been successfully accomplished by Mr. P. B. Hoyt, of Brooklyn; at least he so assures me. Mr. Hoyt is one of our most intelligent and successful amateur photographers. He is by profession an analytical chemist. He has been using my emulsion during the summer with the most satisfactory results. The preservative which he uses is compounded as

follows:—To one ounce of alcohol add one tablespoonful of Japanese tea; let stand a few days, and add half-an-ounce of tincture of nux vomica, half-an-ounce of laudanum, and sixty grains of tannin, or thirty grains of tannin and ten grains of pyrogallic acid. When the emulsion is in good working condition add five to ten drops of this compound to the ounce. Mr. Hoyt assures me that my emulsion so preserved is much more sensitive than the ordinary wet process—in fact, requiring less than half the exposure. All that is necessary in preparing the plates is to flow them with the emulsion and set them away to dry.

I hope on trial that all he asserts will prove to be true. I made several trials in the early part of the summer with preservatives in the emulsions, but with unsatisfactory results. I am, however, satisfied from Mr. Hoyt's statements that the reason why I failed was in over-exposing my plates. I had intended to take up that branch again, but hope Mr. Hoyt has saved me the trouble. I will close this long communication by giving my last formula; it will prevent any further complaint of fog, *as* the chloride is added before the foggy point is reached.* To three ounces of a twelve-grain bromide of cadmium collodion add fifty-one grains of finely-pulverised nitrate of silver dissolved in boiling alcohol, as previously given; shake well, and in six hours add six grains of chloride of cobalt dissolved in alcohol. For the preservative, take twelve ounces of water, and add one drachm each of the following:—Syrup of squills, tincture of nux vomica, and laudanum. An ounce or two of alcohol facilitates the drying, and is, therefore, advantageous. Anyone in trying this process can experiment on preservatives; but I hope they will not condemn the process without trying the one given above.

I forgot to give Mr. Hoyt's method of preparing his albumen, which is as follows, viz.:—

Water	16 ounces.
Albumen of one egg.	
Iodide of ammonium	4 grains to the ounce.

Add a small piece of gum camphor to prevent moulding. I apprehend that the increased sensitiveness which he obtains is due, to a certain extent, to the iodide salt in the albumen solution. H. J. Newton.

THE SEVENTEEN NEGATIVES' CASE.

The famous case, Pearsall *v.* Schenck, to which reference was made in our columns a few weeks ago, has been at length terminated, the judgment being given in favour of Mr. Frank E. Pearsall, the photographer. The case has excited much interest in America, not merely among photographers, but also among the public. Several able articles have appeared in the New York daily papers on the subject, two of which we subjoin, and from a perusal of which the nature and bearings of the case will be clearly perceived.

The case of Frank E. Pearsall, the well-known photographer of Fulton-street, against W. W. Schenck, which came before Judge Morse's court yesterday, is one (says the *Brooklyn Daily Eagle*) which presents both human nature and photography in a somewhat humorous aspect. We had been accustomed to think of the photographer as a being who might justly form an exception to the philosophic axiom that no man should be called happy before his death. Contrasting his placid vocation with the feverish toils of other men the lot of the photographic artist seemed an altogether blissful and rose-coloured existence. To say nothing of the amenities which he daily exchanges with the fair sex, the gratification with which he hears his portraits praised, and the philosophic views of life which his ever-changing procession of visitors is so well calculated to impress upon him, the work itself is so elegant and gentlemanly, so free from vulgar perspiration, that verily the photographer would seem to challenge all trades and professions for the palm of *otium cum dignitate*. The directing the nose of the photographee toward a certain point, a caution against sneezing and the like, a hiding of himself for a few moments behind that mysterious black cloth, its sudden withdrawal, and, presto! the swain in all his glory or the maid in all her charms stands, or rather sits, "confessed," and will very soon be ready for distribution among "mutual friends."

But, "alars! alars!" as defunct Artemus would have said, the photographic art is not thus all *coleur de rose*. Had it been so we should not have the mournful spectacle in Brooklyn of a gentleman and lady sitting seventeen times in seventeen postures, and after every one of the seventeen proofs had been sent home returning it and refusing to foot the bill, and of the majesty of law being appealed to by the hapless photographer.

Whatever the law may be, the equity of the case seems pretty plain—plain, in fact, as that plainness which probably exasperated the lady and gentleman with their pictures. And here comes in a point which customers are very apt to forget. Photography does not make "the human face divine;" it only reproduces it in artistic miniature. The photographer has not even the responsibility of a painter. Photography cannot well err, though the pictures may vary with the light and in finish. An oil painting may conceal a squint, turn a snub nose into a Grecian or Roman, and at the painter's touch rejuvenate the middle-aged and give an air *distingué* to the commonplace. Your plebeian shall look patrician under the touch of a Sir Joshua. But the photographer has no such artistic and amiable discretion. The pimples on the "bottle nose" he cannot away with, neither can he fill out the "lantern jaws." He cannot turn a Pipchin into a Lola Montez, nor make the Honourable Mrs. Skewton as comely as her daughter Edith. The eyes that squint will squint in the photographer's room as much as in the drawing-room. The nose that is snubby will be snubby still, and the mouth that suggests "chops and tomato sauce" will not wear in the *carte de visite* the ungastronomic lines of an archangel's.

It is too bad to blame the poor photographer for the facial accidents of nature. Of every face, as of the poetic soul, it may be said, "*nascitur non fit*," and if it is a bad fit it is not fit that the artist of the camera should be blamed. Yet so unjust are those who are not favourites of nature that they would occupy the time of the artist in reproducing their uncomeliness for the benefit of society, and then refuse to pay him because they are not good-looking. Your "pig-headed" man demands that he shall come forth in *carte* an Adonis, and the spinster of uncertain age expects to be made a Venus.

The man and woman who in seventeen postures are displeasing to themselves ought not to refuse payment to the artist, but should rather pay his bill with alacrity lest he exhibit them in his show-case. In an age when photography has produced a chronic vanity in the public and what may be called "*photomania*" possesses us, when every pastor poses himself, hymn-book in hand, before us in the windows, and the youngest dry goods' clerk thinks himself immortalised if the amber promise of a pale moustache in years to come that adorns his upper lip, and the green necktie that surrounds his throat, and the "mild angelic air" of dry goods that pervades him gleam upon the public in Myrtle-avenue, it is fitting that the rights of the artist for his pains should be determined, and we are not sorry that it has fallen to the lot of a Brooklyn law court to settle the question whether "two hearts that beat as one" may have seventeen sittings for nothing.

Under the heading "A Photographic Victory" the *New York Times* takes a slightly different view of the case. It affects to see a possibility of photographers of a certain class taking more negatives of a sitter than is necessary. It says:—

The Brooklyn photographer who sued for the value of seventeen negatives, all purporting to represent one and the same sitter, and all rejected by the latter as being unsatisfactory, has won the case. Judgment in his favour was pronounced on Saturday last—a day which photographers will hereafter celebrate as their private emancipation day. Henceforth photography becomes a safe and sure business. Not an ounce of collodion nor a teaspoonful of nitrate of silver will hereafter be wasted when used in taking the likeness of a captious customer. The element of uncertainty has been eliminated from the business, and the photographer is now cheered by the certainty that whether his pictures are good or bad his patrons must, at least, pay him for the time and materials he has used in combating with the difficulties of their countenances.

Of course this decision is not a matter of so much consequence to skilful photographers as it is to the beginner who has not yet fleshed his maiden camera on the faces of the public. Hitherto he has been handicapped by the knowledge that unless he made good likenesses he would gain no fees. Were a like restriction to be put upon the young physician, by forbidding him to collect even the cost of his medicines unless he cured his patients, there would be fewer candidates for the medical degree. As it is, the young physician has every reason to make the most of his first patient. The more visits he pays him, and the more varieties of medicines he makes him consume, the larger is his bill for medical services. Besides, a prolonged case fills up the young doctor's spare time, and if he finally cure the patient the very length of the process is regarded by the public as an evidence of the skill with which science has been made to conquer an obstinate determination to die.

The young photographer has now equally good reason for prolonging his efforts to photograph his earlier customers. If he can inveigle these persons into facing his camera, he has only to photograph each one of them twice a day for two weeks to give his gallery a busy and thriving air. No sensible man would, in such circumstances, permit a patron to secure a satisfactory likeness with less than twelve trials. Even a single sitter with an elusive nose which offered real difficulties to the camera would, if wisely managed, give the photographer constant employment and a moderate income for at least a month; and when he finally produced a picture which he could venture to call a likeness he could always silence the complaints of the wearied sitter, and take credit to himself, by hinting that there are some faces at which the camera instinctively revolts, and which only the utmost skill and perseverance can induce the insulted sun to paint.

The public is now informed precisely what it has to expect from photographers. The man who happens to enter the gallery of a young photographer with plenty of leisure must expect either to pursue through perpetual sittings the phantom of a likeness he can never overtake, or he must accept the result of the photographer's first experiments, and

* Mr. Newton gives his formula more in detail at the Photographic Section of the American Institute, reported in the October number of *Photographic Times*.—Ed. *Times*.

leave the gallery before he is financially ruined. In either case he must pay for his picture or pictures, whatever liberties the camera may have taken with him. When this is fully understood there will be an immediate decrease in the number of people who are willing to risk their fortunes and faces in photographic galleries. Indeed, it is possible that the decision over which photographers are now rejoicing may lessen their business, so that it will prove an injury rather than a benefit to them. Time will show what the result will really be. Meanwhile, photographers will hunt in their workrooms for rejected negatives and summon the rejectors to appear and undergo further experiments, or else to pay for glass, time, and chemicals consumed in their service.

Meetings of Societies.

BERLIN PHOTOGRAPHIC SOCIETY.

At the last meeting, in November, of the above Society the proceedings of the evening were commenced by the President welcoming, in the name of the Society, Mr. J. R. Sawyer (of the firm of Spencer, Sawyer, Bird & Co., of London), who was then visiting Berlin, for the purpose of giving instruction in the carbon and autotype processes of his firm.

Dr. Vogel then showed a photograph of the hall to be devoted to machinery at the Philadelphia Exhibition.

Herr Prümm reported on the proceedings of the committee appointed by the Society for the consideration of the proposed new copyright law.

Dr. Vogel regretted that the alterations which the Reichstag seemed inclined to make in the draft laid before it were unsatisfactory to photographers, as affording them even less protection than the provisions of the original draft; for instance, it was proposed to exempt from the operation of the act all reproductions of photographs for manufacturing purposes, so that soap, bonbon, and chocolate manufacturers, &c., might with impunity ornament their boxes, covers, and soforth with photographs copied from original pictures, such copies being considered articles of manufacture within the meaning of the act. He further thought it would be advisable to ascertain how far photographers were protected by law in France, England, and Austria, and to make representations accordingly to the Reichstag.

Dr. Schimann showed two of Herr Stegemann's dark slides, in which the glass corners so often spoken of are introduced, and which greatly increase the accuracy with which these dark slides can be used. He (Dr. Schimann) then made an enlargement from a microscopic object (*Trichine*) by means of his apparatus, which was described in these columns some months ago. The object was illuminated by lime light, the lime cylinder being brought to a white heat by means of a stream of oxygen passing through an alcoholic flame. The light was conducted through a combination lens, concentrated by a second lens upon a mirror, and reflected by the latter upon the object. Between the mirror and the object there was, however, yet another lens by means of which the concentration of the light could be regulated. The exposure lasted two minutes, and the resulting photograph was very sharp.

Herr Schaarwachter said he had received a letter from Herr Möbius, of Moscow, in which the latter mentioned he had obtained several groups, which he proposed to forward to him, in which all the persons appeared equally sharp, in spite of their being placed at very varying distances from the camera. These extraordinary groups are the productions of a photographer in Njni Novgorod, who, it is said, can, with the help of a simple contrivance fixed to an ordinary lens, take groups in which all the persons appear equally sharp, even though there should be twelve feet of difference between their respective distances from the camera. Some of the specimens in the possession of Herr Möbius were taken with a five-inch "Busch," others with a three-inch "Hermagis."

Herr Schüler showed a very successful enlargement which he had made according to Mr. J. R. Sawyer's instructions; that is, by means of an enlarged negative taken from a glass diapositive in pigments. The copy in question was, however, a silver print. Another difference was that Mr. Sawyer works by daylight, and Herr Schüler produced this by lime light with a short-focus aplanatic lens.

Dr. Schimann exhibited in the microscope a collodionised silver film and a carbon film six hundred times enlarged. The latter was no less fine than the former.

The President then showed an English *carte de visite* upon which an extract from the births, deaths, and marriages column of *The Times* was photographed. [Intimations are often made in England by sending such photographs to the relatives and friends of those immediately concerned, but the custom is not so common as Dr. Vogel appears to think; and we are by no means sure that the fashion of making these announcements by photography is not an importation from America, instead of an illustration of the curious manners and customs of the English.]

Herr Mahlow submitted for inspection a sheet of cork as thin as paper, upon which a business card was printed, and showed that it could be folded, like a textile fabric, without breaking.

Herr Talbot terminated the proceedings by showing a number of dissolving views by means of two sciopticons.

THE PHOTOGRAPHIC SECTION OF THE AMERICAN INSTITUTE.

At the last meeting of this Section the President, Mr. H. J. Newton, occupied the chair.

Captain Russell said—I have been converted today to Mr. Newton's emulsion process. Two or three days ago Mr. Leslie spoke of working dry plates, but I was rather afraid to take hold of it. Seeming, however, so anxious to do the outside work himself, I was willing to accommodate him. I called upon Mr. Newton today, and I must say I was satisfied that the dry-plate process was the method of working. I examined there fifty negatives or upwards, and they were all first-class. It made my back feel easier, as an outside workman, and I think I could go out to the Rocky Mountains and do a great deal more in this way than by any other process. I would like to have the President exhibit the specimens which I asked him to bring here to-night.

The President exhibited photographs from negatives made by the emulsion process, the formula being the same as that given at the previous meeting.

Captain Russell: While I was there today Mr. Newton coated a plate and exposed it for a less time than I should give in working with the wet process, and it came out very clear and nice. Anyone who wants to be a thorough convert to Mr. Newton's process needs only to go there and see his plates.

Mr. Mason: Are the emulsion plates susceptible to intensifying equal to wet plates? Suppose a plate is thin when made, can it be intensified sufficiently to print?

Captain Russell: I asked Mr. Newton that same question, and he immediately intensified a thin negative so dense that it printed perfectly white, and did not fill up.

The President then made a communication on this subject. [See page 5.]

Mr. Mason: The *rationale* of the process seems to be to convert a certain portion of the silver on the thin negative into the iodide of silver. It occurred to me that if the solution became colourless an approximate estimate of the amount of the conversion could be made from the amount of discolouration of the solution. The process used by the Photographic Company some years ago was quite similar, and that was one of the criterions which guided us in working the process.

The President: The tendency is to become colourless, of course; but the hydrochloric acid will form a chloride as well as an iodide. There is an idea prevalent that the bromide of silver is more sensitive to light than the iodide of silver; and yet many consider the iodide the more sensitive. When a small proportion of bromide is added to an iodide collodion the sensitiveness is increased in the weak lights; but using the bromide and the iodide pure and simple they give very similar results. The action is very quick in the strong lights, but not quick in the weak lights. Now put into the iodide a mere trace of bromide—half-a-grain is sufficient—and the action of the light upon the sensitive film is very different; or, with a bromide film, add a trace of iodide and you will get the same results—you will increase the sensitiveness in the weak lights. Using Mr. M. Carey Lea's process I found that I could develope the film with pyro. and tannin with just the same exposure that I could with the alkali; but the gain in time did not compensate for the extra trouble in developing.

Mr. D. C. Chapman: Within the last week I have been trying the emulsion. I used the same formula that I used in 1867, which was published in the *Philadelphia Photographer*. I took an ounce of ether and put about twelve grains of cotton into it, and added one drachm of alcohol, which dissolved the cotton. I put twenty-four grains of silver into the other seven drachms of alcohol, and put twenty-four grains of bromide of cadmium in with the cotton and ether and the one drachm of alcohol. That makes a bromide of collodion with only one drachm of alcohol and one ounce of ether. I add the silver to the bromide of cadmium collodion. If I do not find any silver reaction I add a little more of the silver and alcohol until I get a little silver reaction, which I test by washing out a little of the collodion in water and putting in a chloride. If there be any free silver there it will show a milky deposit. I let this stand two or three hours and then add about an ounce of old iodised collodion to four ounces of the emulsion. I shake up thoroughly and try the test again. I washed my emulsion plates afterwards and used plain tannin solution, giving a little longer exposure than usual.

The President: I should not rely upon that test exactly. You would not know whether you had got in a sufficient amount of silver. The union between a bromide and silver is very slow; it goes on for hours. In testing it as you go along you would be almost sure to have silver that did not combine with the bromide. Bromine unites with almost all the metals with such avidity as to set them on fire; but not so with silver.

Mr. Chapman: I never found any reaction until I had more than twenty-four grains of silver to twenty-four grains of the bromide. I add one drachm at a time and shake it up thoroughly each time, and in testing it, when the silver is in excess, adding a single drop of the chloride, it thickens up immediately.

Mr. Mason: The method of Mr. Chapman must be, at any rate, a safe process, even if it leave free silver.

Dr. M. N. Miller: My experience with M. Carey Lea's formula coincides with that of the President. The plates were sensitive, but the negatives were weak. After coating the plate in the ordinary way I found that washing off half the plate and removing all the organifier made no difference between the two halves of the plate. Although I have not kept these plates for any length of time I believe that we may wash the tannin entirely out of the plate and still get good results. It seems to me that the tannin has done all the good it can, and is not a necessary element in the film.

Mr. Chapman: Dr. Vogel took all his plates at the transit of Venus without any preservative at all, and claims that bromide plates do not require any. But in case plates are to be exposed to dampness I think a coating of tannin has the effect of varnish to keep the moisture from penetrating the film and injuring it. I do not think it does any good as far as sensitiveness is concerned.

Mr. Bierstadt stated his experience in the use of Newton's process. He had followed his method exactly, excepting in the length of time that intervened between putting in the silver and the chloride. In the first case he left the silver in excess for twenty-four hours; in the next he added the chloride at the end of two and a-half hours; in the third he added a trace of iodide. They all produced excellent pictures. He had a collodion which had stood so long that it produced an excellent fog, which he could not remedy; but Mr. Newton put in a handful of chloride, and since that it has made pretty fair pictures—not perfectly clear, however. He considered his experiments as bearing out the President's theory of redeeming a foggy collodion.

Mr. Chapman said that if the chloride were not added until after a certain time it then would not save the collodion.

Mr. Charles Bierstadt described his experience in developing coffee plates (dry plates) in making instantaneous views. He used his developer as hot as he could bear his hands in; otherwise he followed the process described by the President. He believed that the image was in the film the instant it was exposed, and that the secret consisted in a suitable developer. In working the picture flashes right out, and all it requires is to be washed off and redeveloped.

The Section then adjourned.

Correspondence.

MR. COOPER'S EXPERIMENTS.

To the Editors.

Gentlemen,—The mention of my name in your leading article on *The Past Year*, in connection with the subject of emulsions, has reminded me that your readers may have wondered at my long silence, after promising to keep them posted up in the progress of my experiments. The fact is my experiments were brought to a sudden close by illness, and for some months I have been rendered almost entirely helpless by a severe attack of chronic rheumatism. I write these few words in a recumbent posture.

Should I be spared, and restored to such a measure of health as will enable me to resume my photographic labours, those interested in the subject may rest assured I shall again attack the emulsion question, and, I trust, with renewed vigour.

With a sincere wish that the new year may prove a prosperous and a happy one to you and all my other photographic friends,—I am, yours, &c.,

Homehurst, Torquay, January 1, 1876. Henry Cooper.

"FRENCH OR ENGLISH?"

To the Editors.

Gentlemen,—I have to express my obligations to your correspondent "Dunham" for his very civil and courteous reply to my query. It seems that M. Lambert, "Mr. Lambert," and "Lambert" are a triunity.

If "Dunham" will turn to your issue of June 18th, 1875, he will find appended to M. Lambert's advertisements a list of testimonials. One from M. Deslandes says:—"It would almost seem incredible that operators without special instruments and *without artistic skill* can obtain by your process such beautiful enlargements, *and yet such is the case.*" Again: another, from M. Pennabert, who says:—"Your method can be easily used by *any* operator, enabling him to obtain in a few moments * * the most beautiful results," &c.

If M. Lambert did not wish his readers to believe that artistic skill was not required to bring about the results he claims, why did he practically endorse and circulate such ridiculous nonsense?

The letter of "Anti-Quack" (*vide* vol. xxii., page 382) had slipped my memory at the time I was writing, or I should not, in all probability, have said anything upon the subject, as I fully endorse all he there says. Charlatanism has been the bane of photography from its cradle, and it promises to accompany it to its grave.

I am not ashamed to be found sinning in the company of such gentlemen as Mr. Brothers and Mr. Samuel Fry (*vide* vol. xxii., page 359); but I must apologise to you for being the means of causing your space to be occupied by such a profitless discussion.—I am, yours, &c.,

January 3, 1876. "Wrecker."

PAPER NEGATIVE MASKS.

To the Editors.

Gentlemen,—In reference to the capital plan of improving negatives, when too thin, introduced by Mr. Brooks—that of attaching a paper negative rendered translucent on the back of the original—it is, I find, with large pictures very difficult to manage by reason of the paper stretching, especially if the subjects be architectural or made up of a number of straight lines at different angles. A bookcase, for example, will show what I mean.

I have found that, when the print has been subjected to the usual routine of toning, fixing, washing, and drying, the paper is not of the same size as before undergoing these processes; but, instead, has considerably elongated in one direction, which I find is invariably that of the width of the sheet. the alteration in the length being imperceptible. This extension is in some instances three-eighths of an inch in a print thirteen inches long—quite sufficient to prevent accurate registration, and to render such a mask useless. I should like to know if other workers have found the same drawback; or is it a peculiarity of the particular samples of paper I have happened to use?

I may say the extension differs with different sheets, and is more perceptible in Rive than in Saxe paper, but in all to a degree sufficient to spoil a mask intended for a large negative of the kind alluded to. With small landscapes the alteration is of little consequence.

If any of the readers of this Journal have experienced the same trouble and overcame it, I should much like to know, through the medium of this Journal, the plan adopted.—I am, yours, &c.,

29, *Torriano Avenue, Camden Road, London,* E. Dunmore.
January 3, 1876.

MR. GORDON'S COLLODIO-ALBUMEN PROCESS.

To the Editors.

Gentlemen,—I was in hopes that Mr. Russell Manners Gordon would have favoured his old fellow-workers in photography with a *résumé* of his new collodio-albumen process in the pages of The British Journal Photographic Almanac for the present year; but I regret to find that his name does not appear in the list of contributors.

As an amateur in the art I should be very grateful indeed to Mr. Gordon if he would favour us with his method of preparing these plates, as it is well understood that the negatives obtained by his formula are in point of result simply unsurpassable. I am quite sure that if Mr. Gordon will respond to what I know is the general wish amongst amateur photographers, he will find that his efforts in perfecting the collodio-albumen process will be properly acknowledged and appreciated.

It would be a matter for deep regret if this process were allowed to pass into oblivion, instead of its becoming, as I believe it would, one of the most popular and useful of all the dry processes, because, after all, the greatest recommendation to any process is perfection of result, which is the prominent characteristic of Mr. Gordon's process.—I am, yours, &c., T. Clarke.

Liverpool, January 3, 1876.

London Photographic Society.—The next meeting of this Society will take place on Tuesday next, the 11th instant, when the following papers will be read:—*On Some Photographic Matters*, by Colonel Stuart Wortley; *On the Photographs of the Arctic Expedition*, by H. Dixon.

South London Photographic Society.—The opening night of the next session will take place on Thursday next, the 13th inst., in the rooms of the Society of Arts, Adelphi, at half-past seven o'clock, when an exhibition of lantern slides will be the feature of the evening. Members who have transparencies of their own taking can have them exhibited by sending notice to the Hon. Sec., and are requested to be prepared with remarks explanatory of the same. Admission free by tickets, to be obtained of the Hon. Sec., 57, Queen's-road, Peckham, S.E.

Mr. Faulkner's Picture of "Simplicity."—By a mistake discovered too late to be rectified, we, in our last number, announced the title of Mr. Faulkner's picture in the Almanac as *Innocence*, instead of *Simplicity*—the latter being the correct designation. In a letter we have received from Mr. Faulkner he desires the readers to understand that this is only a print from the original negative from which the opal enlargement of *Simplicity* was produced. That this will be rightly understood we have no doubt, seeing that in our notice of the picture we observed that it was "a pretty, innocent child, skilfully photographed, enlarged upon opal glass, and deftly worked on by an accomplished artist." This working it was that gave such a charm to Mr. Faulkner's picture. The negative from which our print was made has, in Mr. Faulkner's opinion, no special excellence except that it was admirably adapted for his purpose. Mr. Faulkner says:—"I would also draw your attention to the manner in which the print in the Almanac has been cut and mounted. As you are aware, I attach great importance to the size of pictures and portraits, believing it to be possible by injudicious mounting to destroy all natural or pictorial effect. In the instance before me, the child's head nearly touches the top of the picture, the shape of which is altogether too lanky, and all

child-like character is destroyed. Those who have paid attention to this subject will have observed that great painters allow ample space in a child's picture in order to preserve the proportions of childhood."

Photography in Court: Jacobs *v.* Krutz.—At the City of London Court, on Tuesday last, the 4th inst., this case was heard before Mr. Commissioner Kerr, in which the plaintiff, described as an importer of photographs, sued the defendant, a dealer in photographs, carrying on business in the City, to recover the sum of £17 due for a quantity of photographs sold to the defendant. Mr. Willis appeared as solicitor for the plaintiff, and in stating his client's case said that the defendant called and selected a quantity of German photographs, which were sent to the defendant's place of business, and no complaint was made about them until payment was demanded, when the defendant, after keeping the plaintiff's goods nearly twelve months, offered to return them, which offer his client refused to accept. The plaintiff being called corrobated his solicitor's opening, when the defendant gave evidence that he only saw a specimen of the photographs when he called upon the plaintiff, and did not open the parcel for some time after he received it, when he discovered that the pictures were much faded, and by no means equal to the specimens he had seen. In cross-examination the defendant denied that the photographs were destroyed by damp. In answer to the judge the defendant said he did not know why he had not returned the photographs at once when he found them defective; upon which his Honour said that the defendant should have done so, and as they had been kept for nearly twelve months judgment must be entered for the plaintiff for the full amount claimed. The judge granted the plaintiff the costs of the cause and also those of his solicitor.

EXCHANGE COLUMN.

No charge is made for inserting these announcements; but in no case do we insert any article merely *offered for sale*, that being done at the small cost of one shilling in our advertising pages. This column is devoted to exchanges only. It is imperative that the name of the person proposing the exchange be given (although not necessarily for publication, if a *nom de plume* be thought desirable), otherwise the notice will not appear.

Magic lantern, with four and a-half-inch condensers, complete for oil or lime light, with quantity of painted and photo. slides, will be exchanged for 9 × 7 portable camera, with double dark slides, or for cabinet camera, with sliding back.—Address, S. S. Crewdson, Union-street, Ulverston.

ANSWERS TO CORRESPONDENTS.

☞ *Correspondents should never write on both sides of the paper.*

F. W. Bannister.—Received. Thanks.

G. B. E.—The reticulation in the film is caused by the presence of water.

⁂ With the present number is given the Title-page and Index for our last volume.

Canny Scot.—Lenses of the kind described may be purchased at prices varying from three to twelve pounds, according to the various circumstances by which the prices of lenses are governed.

J W. Livesay.—Our correspondent is desirous of knowing where he can obtain photographic views taken in Brittany and Normandy. Will any reader give the information sought? We might suggest an application to Messrs. Marion and Co., Mr. Frith, or others who deal largely in photographs.

W. D.—The patent for the aniline process of printing has still nearly four years to run ere it expires. We have not heard of any license having been granted under which to practise this process. Had the recently-proposed amendment of the patent laws been carried into effect, Mr. Vincent Brooks, the proprietor of the patent, would have been compelled to grant licenses for practising it; but under the existing law he may retain in his own hands all monopolies in connection with Willis's process of aniline printing.

J. H. L.—1. The painting of the side walls at the background end of the studio will certainly add much to the power of the light.—2. Many of those who enlarge professionally still use the lime light, although its use is not so prevalent as it was formerly. Success depends upon using a thin, clear negative, a paper salted with iodide and bromide of silver, and excited upon a forty-or fifty-grain bath made *ve y* acid with acetic acid. The development may be effected either by means of a hot solution of gallic acid or by pyrogallic acid.

J. C. S. writes:—"A few days ago, on testing the window of my dark room, I found that wet plates fogged in half-a-minute when held about eighteen inches off. The window faces north. It was supplied by a good firm to a friend who used it for some time without its showing any signs of not being perfectly non-actinic. I examined the casement carefully, and am positive the fogging is not due to any white light coming on the plate. Have you or any of your readers known a similar instance of fading? A single thickness of yellow calico entirely cures the defect, but then the advantage of a glass window is lost."——We are aware of several kinds of orange glass being in the market which answers to the description given by our correspondent. We sometime ago experienced a similar annoyance, but got rid of it by removing the orange glass from our dark-room windows and substituting ruby glass.

J. S. Cartwright inquires if it be not, in our opinion, an immoral act for professional photographers to exhibit specimens taken by others. In reply: If a professional photographer exhibit the specimens in such a way as to lead the public to believe that they are his own work he is guilty of deception. But we know several photographic establishments in which the windows are well stored with portraits of celebrated characters, and which portraits are kept on sale, these, in some instances, bearing the names of the artists by whom they were taken. The "immorality" of the act must be determined by the intention of the exhibitor.

Rev. Henry Lockwood.—Charming albumen pictures upon opal glass may be obtained by beating into a stiff froth the whites of as many eggs as you like, previously adding to it chloride of ammonium in the proportion of about eight grains to the ounce. When the froth subsides a clear liquid is left, with which the opal plates must be coated, keeping them in a level position until they are quite dry. They are sensitised in a strong bath of ammonio-nitrate of silver, followed by a slight rinsing in water. When dry they are printed in the usual way under a negative, the subsequent treatment being the same as for prints upon paper, with the exception of the final washing, which need not be nearly so long.

A. A. B. asks—"Can any of your readers inform me how to make, or where to procure, the best varnish for coating the inside of a wooden washing-trough that is used for washing paper prints?"——We reply that shellac dissolved in alcohol is usually considered the best varnish for this purpose. The first two or three coatings applied must be very thin, so as to sink well into the pores of the wood; the last coating should be rather thick. We shall, however, be glad to learn the experience of others on the subject. Bees'-wax and paraffine, each by itself, and also mixed together, have been successfully used for giving an interior coating to wooden baths intended for holding solutions of nitrate of silver; and either of these, we think, *ought* to answer well for coating a washing-trough.

F. E. J. inquires—"Will you please tell me the best way to obliterate writing or any marks made with writing ink—say from the centre of this letter—so that I could write over the same spot without its being seen, even on close examination?"——We have frequently made use of hydrochloric acid in the removal of ink stains, and have found it to answer quite well. A favourite method with many of removing ink stains, or writing made by means of ordinary writing-ink, is to apply a concentrated, very hot solution of oxalic acid. It may be applied by means of a dabber of cotton wool, and the paper or fabric should be kept warm by being held over a small vessel containing hot water. While on this subject we may here state, what we have mentioned on a previous occasion, that we have successfully removed ink stains from photographs by placing them in a flat vessel and pouring over them a little hydrochloric acid. The stains are removed, but the picture, which must have been properly toned, is not injured by this treatment.

Canon Beechy, Colonel Stuart Wortley, and Mr. M. Carey Lea.—Certain topics of a historical nature entered upon by these gentlemen, in the course of recent communications, have seemed to a number of correspondents to afford good ground on which to have a free fight; but in the desire to eliminate from the present volume, of which this is the first number, everything that savours of a belligerent character, we have suppressed numerous communications offered in furtherance of a discussion out of which no good could possibly arise, but which, on the contrary, might tend to perpetuate misunderstanding. In the course of a conversation with Canon Beechy we have dissuaded that gentleman from writing a letter which it had been his intention to do; and we also here acknowledge the receipt of a letter from Colonel Wortley on the subject of the excess of silver in emulsions, in which he enters into historical matters with the aspects of which our readers are not altogether unacquainted. Respecting other contributions on this subject we simply here acknowledge them *en masse*.

☞ **Editorial Communications should be addressed to "THE EDITORS"—Advertisements and Business Letters to "THE PUBLISHER"—at the Offices, 2, York Street, Covent Garden, London, W.C.**

METEOROLOGICAL REPORT,

For the Week ending January 5, 1876.

Observations taken at 406, Strand, by J. H. Steward, Optician.

These Observations are Taken at 8.30 a.m.

Dec.	Bar.	Wind.	Wet Bulb.	Dry Bulb.	Max. Tem.	Min. Tem.	Remarks
30	30·34	W	44	46	49	44	Dull
31	30·21	S	40	43	47	42	Dull
Jan.							
1	30·02	W	45	47	49	42	Dull
3	30·11	W	52	53	55	39	Dull
4	30·30	NW	45	47	49	44	Foggy
5	30·41	SE	33	34	47	32	Dull

CONTENTS.

THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 819. Vol. XXIII.—JANUARY 14, 1876.

PRIZES FOR PHOTOGRAPHIC PROGRESS.

In our Paris Correspondent's communication we publish conditions under which the Photographic Society of France has offered a prize which promises to bring about a lively competition. The French Society is to be commended for the course it has taken, as well as M. Liebert, who also gives a prize, but whose conditions are not yet published.

In the first competition—that for the best dry process—the Society apparently recognises the value of the washed emulsion process, as it distinctly stipulates that the preparation, whatever it may be, shall require no washing after pouring upon the plate. In order to obtain the finest results it will be, therefore, necessary to produce an emulsion containing no soluble or crystalline matter, and so far this result has only been obtained by "washing" the emulsion, drying, and re-solution.

A field of competition is thus opened to those gentlemen who have so far interested themselves in the progress of such emulsions, whether they be of collodion or gelatine; but the latter form, we fear, between patent rights on the one side and want of keeping quality (when steering clear of the patent) on the other, will be *hors de combat.* There are now several different forms of collodion emulsion which are prepared under varying conditions and for which are claimed different advantages, so that, pending the probable introduction of further modifications of the original, it behoves those who have already worked in this direction to bestir themselves in order to improve, as far as possible, the processes already published. It is not our duty, now, to suggest any means of so improving the various processes; but we hope that our English workers will bear in mind that the washed-emulsion process originated in our own country, and will do their utmost to prevent a stranger from carrying away the palm.

But the competition for the prize offered by M. Liebert is not only more stringent in its direct requirements, but affords greater scope for research. A process that shall be "much more rapid" than those hitherto in use is what the photographic world has been in search of for very many years, but no satisfactory solution of the question has yet been given. Here is an opportunity for our experimentalists to distinguish themselves. The conditions so far are very open; competitors are not tied down to any one style of process, either wet or dry, the only requirements being greater rapidity combined, we presume, with quality of result.

We must wait until the full details of the conditions are published ere we can say much as to the direction in which experiments should be made; but, at the same time, there have been many methods published lately by means of which it is asserted that the exposure is decreased most materially, as compared with the ordinary wet process. Amongst them we may mention pre- and after-lighting—two methods which, though apparently identical in action, have caused much discussion, not only as to which is the best, but also as to the benefit derived from either the addition of nitrate of uranium to the silver bath, which has also been much questioned as an advantage, and also the use of various substances (methylal, for instance) in the developing solution. These are all connected with and adjuncts to the ordinary wet process; and how far they may come under the conditions of M. Liebert's committee we cannot at the present moment say, but there is no real necessity for confining ourselves to the ordinary wet process. We have been told that some forms of bromide emulsions when used wet, under certain conditions, are *twice as sensitive* as the best wet plates. Though we have not ourselves obtained such favourable results, we have had sufficient encouragement to make us believe that in some form of bromide plate will be eventually found the most rapid mode of working.

The only thing which now prevents the introduction of that kind of plate into pretty general use is the conservatism of professional photographers, or perhaps some worse characteristic. Those gentlemen are not, as a rule, acquainted with the alkaline mode of development, which is known to give the best results with bromide plates; and, being unwilling to learn, they adhere to the processes and formulæ of twenty years ago. Conservatism is very well in its way, but *obstruction* is to be deplored in any case; and we can only express a hope that our English photographers will bestir themselves a little and endeavour to bear away the prizes so generously given by our neighbours across the Channel.

KENNETT'S PORTABLE CAMERA STAND.

It is only those who belong to the nomadic section of the brotherhood who can appreciate to the fullest extent the portable camera stand, or who can most equitably balance the advantages and disadvantages connected with this important piece of apparatus. It is not enough that a stand be portable; that quality is easily secured. Stability is of much greater consequence; for, if wanting in this essential, a camera stand would to a great extent be valueless. The questions arise—How can the portability so much prized by the peripatetic artist be best associated with the steadiness so necessary in a good stand? And, further—How can these two qualities be allied to two of scarcely minor consequence, namely, convenient adjustability and great height?

In a stand which has been submitted to us to be tested crucially Mr. R. Kennett has endeavoured—with what success the reader will presently be enabled to determine—to give a practical answer to the foregoing questions. Having been engaged for upwards of a month past in perfecting the details of a stand exhibited at the last meeting of the South London Photographic Society, Mr. Kennett now feels himself in a position to request us to publish such details as will convey to our readers a clear idea of the qualities of the stand.

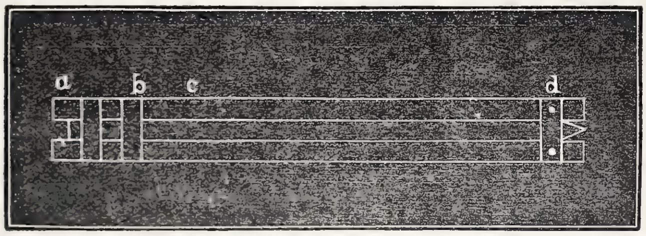
When packed up this stand measures three feet in length; and when the legs are opened out each leg measures five feet seven inches. Allowing for the legs being extended to a moderate extent when the tripod is erected for use, this gives such an elevation of the camera as to bring the ground glass on a level with the eyes of a person of more than average height when standing erect. But the longitude of the legs being capable of adjustment, the altitude of the camera may be so far diminished as to be brought below the level even of a child.

Each leg of the stand is composed of three pieces, like the well-known and favourite portable stand in which the centre piece

revolves on a pivot near one end, on the pocket-knife-blade principle. But in this case the centre portion of the limb is made to draw in and out from between the two outer parts to any desired extent—a kind of adjustment in which there is no novelty. The great convenience of Kennett's stand is to be found in the manner in which the adjustments are instantaneously secured as soon as they are made, in the facility with which such adjustments are completed, and the perfect rigidity of all the parts secured by bringing into play the wedge principle, which is induced in a pair of parallel wooden rods by mere pressure of the finger and thumb.

The annexed diagram *(fig. 1)* shows one of the tripod legs when packed up, and by studying it the nature of the arrangement will be

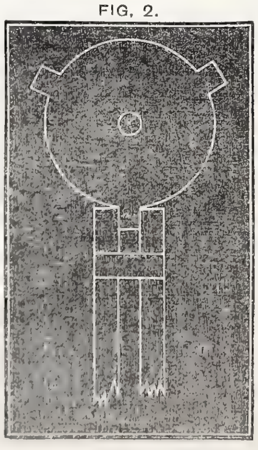
FIG 1.



easily perceived. The ferrule *d* being screwed to the two outer legs at the lower end keeps them firmly in position at such a distance apart as to allow the centre rod to slide out. There being slots cut in the inside of the two outer limbs, into which projecting pins traverse, the centre piece pulls out perfectly straight. When drawn out to the desired length it is secured from running back again by the ferrule or band *b*, about which, and its manner of fitting the outside of the rods, there is a slight peculiarity which we will explain. From *c* to the end *a* of the rods there is a slight taper, the width being narrower at *a* than at *c*, although this deviation from parallelism is so very slight as not to be perceived unless by actual measurement; from *c* to *d* the two slides are parallel. Now, keeping in mind the slight taper at the *a* end of the leg, it will be seen that the lower ferrule *b*, which is now "jammed" on as far as it will go, cannot be made to approach any nearer to the lower end so long as the centre rod remains where it is seen to be; but no sooner is this rod pulled out to any extent than the ferrule *b* can be moved up after it, and in the course of its motion downwards the two outside bars, no longer kept apart by the centre one, are brought a little closer together by the sliding ring *b*. As a direct consequence of their being thus brought closer together the centre rod becomes tightly wedged in whatever position it happens to be when overtaken by *b;* and, although by dint of a "strong pull," the centre piece of the leg may be withdrawn still farther, it cannot be made to go backwards, nor, indeed, could it be *forced* backwards, so long as the runner *b* remains whole.

It will now be asked—Of what use is the ferrule *a*, of which nothing has yet been said? The head of the camera stand has three projections, as shown in *fig.* 2, into each of which the ends of the rods work by means of pins, the position of which are indicated by the dotted line; and it is the function of *a* to keep these sides closely clamped against the projection, which, being just a little wider than the centre rod, causes that end of the two rods to be opened out into an appreciable wedge, to the upper or wider end of which the piece *a* cannot quite reach, and hence becomes pinched. It will thus be seen that one runner pinches the sliding rod when it is moved in a downward direction, the other pinching in an equally firm degree the projection of the head of the camera stand.

FIG. 2.



The stand which we have now endeavoured to describe is certainly well worthy of imitation, seeing it fulfils in an excellent manner all the conditions necessary in a good camera stand. In order that makers of apparatus and others with mechanical proclivities may have an opportunity of seeing the stand itself which has here formed the subject of description, Mr. Kennett has kindly acquiesced in our suggestion that it remain for ten days at our Publishing Office, where it may be seen by those interested in the improved construction of camera stands.

ON CHROMIUM.

Although we are still, and likely for some time to be, dependent on the salts of silver for the production of our negatives, that noble metal is gradually but surely being replaced by chromium in the production of positive prints. In view, then, of the important part which that not well-known metal already plays, and the much more important part which it is yet destined to play, in photographic manipulation, we think a short article may not unprofitably be devoted to some of its peculiarities and properties, and especially to those of its salts at present employed in photography. Of course in speaking of chromium as a not well-known metal we refer to it in the metallic state, some of its salts, such as the alkaline bichromates, having been largely used in the arts and manufactures, and its insoluble chromates known as brilliant pigments, for a long period. It does not seem to exist in large quantities, or to be very widely distributed over the globe; but in combination with iron, as chrome iron ore ($Fe\,O\,Cr_2\,O_3$), and with lead (as $Pb\,Cr\,O_4$) it has been found in America, is received in considerable quantities from the Shetland Islands, and is much worked in Sweden.

Metallic chromium has not, so far as we know, been utilised in the arts, either *per se* or as an alloy, although it possesses some properties which, if it could be readily procured, should make it very valuable. When reduced from one of its oxides by the action of an extremely high temperature in the presence of charcoal the metal is said to be as hard as corundum, and quite infusible, or at least at a temperature high enough to melt and even volatilise platinum; while, though soluble in hydrochloric acid, sulphuric acid acts on it but slightly, and it is quite insoluble in concentrated nitric acid. It may also be obtained in a crystallised form by the action of the vapour of sodium on one of its chlorides, in which state it resists the action of the strongest acids, including the nitro-hydrochloric.

Chromium is sometimes said to unite with oxygen in five different proportions; but it certainly forms four different oxides, in which we find examples of all the three kinds—basic, neutral, and acid. The basic oxides ($Cr\,O$, and $Cr_2\,O_3$) yield several chlorides and other salts, one of the former, the dichloride ($Cr\,Cl_2$) being the most powerful reducing or deoxidising agent known to the chemist. The neutral oxide corresponds with magnetic oxide of iron, and is not of much importance; while the fourth is a very stable metallic anhydride ($Cr\,O_3$), which unites with an atom of water, forming chromic acid ($H_2\,Cr\,O_4$)—probably the most valuable of all the compounds of chromium, and similar in constitution to sulphuric acid, chromium taking the place of sulphur, in which the hydrogen is readily replaceable either in whole or in part. An excellent example is found in the soluble potassium chromate, in which two atoms of potassium take the place of the hydrogen, forming $K_2\,Cr\,O_4$.

In the manufacture of chromium salts it is this potassium chromate that is first produced. Chrome iron ore is heated to redness, and quenched with water, whereby it is rendered sufficiently brittle to be easily reduced to powder. This is mixed with potassium and calcium carbonates, and exposed to a prolonged heat in a reverberatory furnace, with free access of air, the oxygen of which it absorbs, and becomes yellow in consequence of the formation of the potassium salt. The yellow mass is withdrawn from the furnace and the salt dissolved out with water, from which it is then rapidly crystallised. $K_2\,Cr\,O_4$ thus formed is then treated with sulphuric acid, which combines with half of the base or one atom of the potassium, and gives the well-known potassium bichromate, $K_2\,Cr_2\,O_7$.

Potassium bichromate so obtained is, generally speaking, the basis from which all the chromium compounds in use are produced, and it and the corresponding ammonium salt are the only preparations of chromium that have been hitherto made to do duty in photographic work. The principal property of these, as well as of most of the chromium salts—and that to which they owe their introduction into

photographic practice, calico printing, &c.—is the readiness with which they give and take oxygen. Potassium bichromate has been the subject of at least one patent for the economical production of that body, as it gives it off steadily and plentifully on the addition of sulphuric acid, while the ammonium salt parts with it at a comparatively low temperature, or, rather, only a low temperature is required to start the decomposition. If a few crystals are placed in a porcelain dish and heated over a spirit lamp or Bunsen's burner the gas almost immediately begins to come off; and, although the source of heat be removed the action continues, the mass becoming incandescent, increasing enormously in bulk, and acquiring a fine green colour—the sesquioxide $Cr_2\ O_3$. But neither heat or acid are needed to induce the salts to give up some portion of their oxygen, the simple action of light slowly but surely having that effect; and although, in consequence of their colour, that action is confined to the surface, it is well-known that, if exposed to strong light, the bichromates are injuriously affected.

It is, perhaps, not so well known that there is still much impure bicromates in the market, the impurities being sometimes accidental, but more generally, we are informed, intentional, by the introduction of sulphates and chlorides. If this be so, it will account for many of the failures which are from time to time recorded by those who have experimented much in carbon printing, Happily the photographer of average intelligence may easily satisfy himself as to the purity of his salts by a simple test. To a weak solution of the suspected bichromate—say not stronger than one in sixty—add a weak solution of tartaric acid in excess—about eight times as much of the acid as of the salt—and stir well for a short time. The acid will decompose the bichromate, and, after allowing the whole to settle, the supernatant liquid should be tested with nitrate of silver and chloride of barium; if chlorides be present they will form silver chloride, while sulphates will form barium sulphate.

Of the cause of the action of the bichromate on soluble organic matter we have left ourselves very little room for remark, nor are we sure that the matter is as yet well understood. We know that the effect is by a gradual action to render them insoluble, and that that action is rapidly promoted by light. The general opinion is that the bichromate is partially reduced to chromic acid; that it gives up a portion of its oxygen and passes into a lower oxide, and that the insolubility is caused by the action of the nascent oxygen probably combining with some of the hydrogen of the organic matter. Whether this be the case or not it is now pretty generally understood, and the results of many experiments seem to prove, that a carbon tissue is only sensitive when dry, and that after it has been printed and thorougly moistened it may be exposed to ordinary daylight with impunity. This fact is of great importance to carbon printers, as the development, in consequence, may be carried on in a strongly-lighted room, where, of course, it can be better and more conveniently done than in the more feebly-lighted "dark chamber."

We have said that the alkaline bichromates are the only salts which have hitherto been to any extent used in photographic operations; but from the fact that salts of chromium include both powerful oxidisers and deoxidisers, and the facilities that they offer both of acting on, and being acted on by, other bodies, and especially from the nature of the changes brought about on them by the action of light, we believe that they offer a rich and tolerably unworked field of experimental research to those who have the time and ability for the work.

One word of caution may not be out of place. In virtue of the oxidising properties of the alkaline bichromates they are generally of a more or less poisonous nature, readily combining with and destroying animal texture, and frequently producing serious ulceration in the bodies of those engaged in their manufacture. We know a case where a photographer who, some years ago, experimented somewhat extensively in the preparation of carbon tissue suffered severely in this way. Both his hands were covered, first with small pimples, which gradually coalesced and festered, and ultimately resolved themselves into deep-seated ulcers, which for months refused to yield to local treatment, and a cure was not effected till a long course of constitutional treatment had been undergone.

ORGANIC PYROXYLINE.

Complaints have sometimes arisen respecting the difficulty o obtaining intensity in the collodio-bromide process unless under such circumstances as militated against sensitiveness, and it is now a recognised article of an emulsionist's faith that the pyroxyline proves, in a very great degree, the key to the position of success.

The rich bloom and excellent qualities of Mr. J. W. Gough's negatives have been universally recognised, and we are pleased to be able to record the fact of his having added to the numerous practical hints he has so freely given to photographers by communicating the particulars of his method of preparing an organic pyroxyline, or, as he prefers to designate it, "papyroxyline." Mr. Gough's formula is as follows:—To every twelve ounces of sulphuric acid used in the preparation of the papyroxyline an addition of sixty grains of isinglass, previously dissolved in hot water, is made, before immersing the cotton or *papier Joseph*.

Curiously enough, by what we must call one of the coincidences of photography, almost simultaneously two formulæ identical in principle have been recently published, viz., Mr. J. W. Gough's in The British Journal Photographic Almanac, and Colonel Stuart Wortley's in the *Almanac* issued by a contemporary. As we presume the latter gentleman has at length given a description of his much-vaunted "organic pyroxyline," it will prove a matter of regret to him that he has permitted Mr. Gough to secure priority of publication. Such, indeed, is the claim we make on Mr. Gough's behalf; and, as Colonel Wortley always attaches much importance to priority in all matters, however small, it may save some future trouble if in this case it be settled at once. Mr. Gough's formula appeared in an article published in our Almanac issued on the 3rd instant; Colonel Wortley's in that of the annual published by a contemporary issued on the 7th instant.

Since the publication, last week, of Mr. H. J. Newton's communication on the subject of intensification as applied to bromide emulsion plates, and the discussion which took place thereon at the last meeting of the Photographic Section of the American Institute, we have given the subject a considerable amount of attention, with a view of deciding as to whether this method possesses any distinct advantages over others already in use. Mr. Newton's plan, as our readers will remember, consists in applying to the fixed and washed image a mixture of iodine and hydrochloric acid, followed by intensification in the ordinary manner with iron and silver. There is, we need scarcely say, nothing new in this method, except so far as its special application to emulsion plates is concerned; and we further believe that it is very far from possessing aay advantage over other systems, but rather the contrary. We will state our reasons for so believing. In the first place, the action of the iodine is to convert a *portion* of the silver of the image into iodide, which is reconverted by the intensifier, and made to receive a further deposit of silver. The *partial* conversion of the silver gives rise to an element of uncertainty as to what will be the final effect, while the deposit of fresh silver over the whole of the image—high lights and half-tones alike—tends to the production of anything but delicacy of result. Let us recommend Mr. Newton to try the chloride of copper process described by us in our last volume (page 277), which is totally different in principle. In this case the *whole* of the silver is converted and then redeveloped by the alkaline method, without any "piling up" of fresh silver. The action is, in effect, more a changing of the colour of the image than anything else, and is perfectly under control, so that any desired effect may be produced from the merest addition of strength to complete opacity; or it may be used to lower the density of a hard negative. Finally: it is *quite impossible* to fog the plate during the operation.

At the meeting of the London Photographic Society, on Tuesday evening last, Colonel Stuart Wortley read a paper embodying several matters, including that of the alleged increase of sensitiveness conferred upon the wet collodion process by the addition of nitrate of uranium to the silver bath. He explained that the last

added is not that of commerce, but that which has undergone a preparation or purification of a certain kind. This consists in first dissolving the commercial nitrate of uranium in sulphuric ether and decanting the clear solution from a precipirate that falls, afterwards crystallising this ethereal solution. The advantages Colonel Wortley claimed for an addition of this salt to the bath were—an increase of sensitiveness, freedom from pinholes, the power of retaining the plate in a moist state for a longer time than usual, and exemption from flare. Whether these claims will be substantiated by any others who may be induced to try this addition remains to be seen. We sincerely trust such may be the result; but, meanwhile, we may point out to photographers who desire to secure the two former of these qualities that they may be obtained in a very simple and inexpensive manner, viz., by the addition of nitrate of baryta to the bath, as proposed by Mr. A. L. Henderson, and endorsed by many photographers. To dethrone the barytic salt, nitrate of uranium will not merely have to behave equally well, but give an *increased* degree of immunity from those evils for the cure of which its addition is proposed; for, being so much more expensive than the other, photographers will expect a *quid pro quo* in proportion. We trust that Mr. Werge will re-try his experiments, preparing his bath in accordance with the new light thrown upon the matter.

ROGER LAURENT'S PHOTO-MECHANICAL PRINTING PROCESS.*

The Printing and Further Inking of the Gelatine Paper.—The inked gelatine paper is lifted off the glass plate on which it was placed to undergo the last operation, and is laid, picture side uppermost, upon a zinc plate previously damped with a sponge. Care must be taken during the printing not to displace the gelatine sheet upon the zinc plate.

A fold of thin, clean paper, with a hole cut out in the centre the exact size and shape of the drawing, placed so as to surround the picture, is laid above the gelatino-paper printing plate to preserve the margin, above that the white paper to be printed upon is laid, and above that again several layers of paper in the form of a cushion and a piece of thin, glazed cardboard. The whole is then passed between the rollers and the printed paper taken carefully off the printing plate. If the pressure has been strong enough all the colour will have been transferred from the printing plate to the white paper.

The printing plate is then dipped for a moment into water that it may absorb a little moisture, and is then inked again—this time, however, with lithographic rollers. Those which I use are of copper, and are perfectly smooth and even. They are eighteen centimetres long and eight inches in diameter, and are covered with several folds of flannel. Similar rollers may be obtained along with directions for their use at any lithographer's. Good rollers are indispensable for good work. The first impressions are seldom good; the best are, as a rule, obtained after the first three or four. Great care must be taken to clean the whites properly with the finger and the wet sponge. The sponge had better be used with a circular motion. If the gelatinised paper rise either wholly or partially from the zinc plate during the inking it must be replaced quite flat, because it cannot be properly inked if there are air-bubbles under the paper.

If the lithographic roller is new it must be rolled some days before being used in linseed varnish, in order to make it pliable and to prevent the ink from drying up fast upon it. When the roller is thoroughly saturated with the varnish it must be scraped with a knife and the rough side of a leather in order to remove any superfluity. It is then rolled first upon the glass plate upon which the ink is spread, and then upon a clean plate in order to distribute the ink equally over it and to remove the surplus. The roller so inked is passed once in every direction across the gelatinised paper, but softly and without a very strong pressure, as the gelatine film is easily injured. When the sheet has been once well rolled in this way it is cleaned with the finger or a wet sponge, and then with a roller upon which there is no ink and which has been previously rolled upon a clean plate. This second rolling removes all the colour remaining upon the swollen parts of the gelatine, but leaves it upon the parts affected by the light which form the drawing. The effect of this roller is surprising, as, when it passes, the drawing immediately stands out clean and sharp. Finally: a damp sponge is once more passed over the sheet, it is dried with blotting-paper, and is then ready for the press.

The inking with the roller is better than with the finger. It is more equal, more regular, and finer, and, consequently, the impressions are sharper. We can print upon sized or unsized paper, but the latter takes on the colour best. Splendid results are obtained on Chinese paper. A well-stamped-out print stretched upon a wooden block to dry is a picture which has a good effect when framed and glazed.

I will not absolutely maintain that the process just described can compete commercially with the various heliographic processes already in use, but I believe that for amateurs, engravers, and artists it may be of great use. We can not only print neatly by means of it upon paper, but upon all sorts of textile fabrics—upon silk for fire- and window-screens, upon wood for wood-cutting, upon lithographic stone, metal, porcelain, enamel, &c., about which I have something more to say.

Various Uses of the Process.—If, after pulling three or four impressions, the prints are so good that on looking through them there are no longer any imperfections visible, then the plate is in a condition to be printed from upon wood, stone, porcelain, metal, glass, &c. If it be wished to print upon wood for wood-cutting no inverted negative is required; but a printing-press, or, at least, a strong letter copying-press, must be at hand, as a roller or lithographic press is unsuitable. The blackened sheet of gelatine is laid flat upon the well-cleaned surface of the wood, and any air-bubbles may be removed by pricking them with a needle without injuring the picture. On the wrong side of the sheet of gelatine a piece of damp cloth is laid, and upon that several layers of common paper, then a sheet of india-rubber to regulate the pressure, and, lastly, a sheet of tin or copper. It is now placed in the press, pressed together, and immediately taken out; then the back of the gelatine paper is made very wet, and as soon as the gelatine is softened it is taken up.

In order to print upon zinc or copper plates the latter must be carefully cleaned, levelled, polished, and ground and grained according to circumstances, until the surface is perfectly equal. The blackened sheet of gelatine is laid upon the metal plate under water, and all the air-bubbles carefully removed. They are then lifted out of the water, and all the superfluous water removed by smoothing the gelatine paper with the hand and allowing it to dry upon the metal, to which the pressure of the atmosphere causes it to adhere. When it is quite dry—which is generally in some twenty-four hours—the metal plate, with the gelatine paper still adhering to it, is again placed in the water for a couple of hours, until the gelatine springs up. The gelatine paper is then taken off and the printing-ink of the drawing is transferred to the metal. These plates can be etched; and as the fatty ink resists the acid they can also be used for zincography.

If one wish to print upon lithographic stone the picture must be reversed. This is also the case with all other printing plates. It is done either by means of an unreversed negative or by means of a transferring or reprinting ink; that is, a fatty ink containing wax, and transfer paper sized only on one side. If one wish to do much at photolithography it would be as well to obtain the assistance of a skilled lithographer.

The drawing upon the sheet of gelatine is blackened with reprinting ink diluted with oil of lavender. It is then printed upon the sized side of the transfer paper and from that upon the stone. When the latter is prepared for printing the transfer print is laid upon it, air-bubbles are carefully avoided, and when once it has been laid down it must not be shifted. Above the transfer paper a wet cloth is laid, above that an india-rubber plate, and, lastly, a metal plate. In the press a fold of cloth or a layer of india-rubber is placed under the stone to guard against breaking it. I prefer a press with vertical action to a lithographic press. After being pressed the back of the transfer paper is damped with a sponge and then removed.

I should like to add a few words upon the photographic part of the work, which is twofold, whether one makes a negative for the ordinary silver or for the heliographic process. The plates must be *extraordinarily* clean. A bottle containing one part of nitric acid and ten parts of water should always be at hand from which to pour a few drops on the plate. The solution is rubbed off with a clean rag, the plate washed with clean water, and allowed to dry. I prefer to use the concave side. The following is the formula for my iron developer:—

Water	1000 grammes.
Sulphate of iron	35 „
Sulphate of copper	35 „
Acetic acid	40 „
Alcohol	80 „

Great attention should be paid to the development. As soon as the details of the picture appear the developer must be removed

* Concluded from page 5.

and the plate washed; if too long over it the plate will be fogged and the finer details will be wanting.

I advise the use of neither hyposulphite of soda nor of cyanide of potassium for fixing, but of sulphocyanide of ammonium, which fixes the plate very well without attacking it, like cyanide of potassium.

The intensification of the plate with pyrogallic acid I do not advise, as it conceals the finest lines and details, which ought always to be avoided. If the drawing be only clear and transparent the negative need not be thick. The proper exposure should be hit as nearly as possible, so as not to require intensification with pyrogallic acid. After the plate is fixed and washed, a solution of one gramme of chloride of gold in 1,000 grammes of water may be poured five or six times over it.

Reversing of the Negative.—A reversed negative may be produced by exposing the original negative with the glass side next the lens. But this has the well-known drawback of flattening the negative; therefore I mention the three following processes:—

1. Instead of varnishing the finished and dried negative pour over it a warm solution of one part of gelatine in five parts of water. Then lay the plate perfectly horizontal upon a vessel containing hot water. Brush the gelatine over the plate with a fine pencil, taking care not to injure the picture or to let air-bubbles form. Then lift the plate off the dish and place it horizontally on a stand. About a quarter of an hour after, when the gelatine has stiffened, it may be placed in an airy room, and left to dry of itself. When it is quite dry run a knife round the edge of it, and the whole picture film can easily be lifted up; that is, if the plate was quite clean. This film can be kept between the leaves of a book, taking up but little room; or it may very well be sent by post.

2. Let a sheet of clean, clear, transparent gelatine of the best quality, large enough to cover the plate to be taken off, soak for a few hours in cold water; then lay it, still cold, upon the dry picture side of the negative to be taken off. Air-bubbles are to be avoided by lifting up the gelatine, without disturbing the picture film, and by pricking it with a needle. When necessary several sheets of gelatine may be laid side by side, or crosswise above each other, and then resting the plate horizontally upon the edge of a vessel containing water of about 100° Cent. The gelatine melts, and by means of a fine pencil an equal film is produced and the air-bubbles which may have been formed are destroyed. The plate is laid horizontally upon a stand until the gelatine has formed, and is then placed in an airy room to dry, which takes twelve, twenty-four, or even thirty-six hours. The film is removed by running a knife round the edge of the film.

3. Essence of eucalyptus mixed with an equal volume of alcohol has the property of dissolving collodion cotton. Dissolve, then, as much collodion cotton in it as will bring the mixture to a syrupy consistency, and pour it upon a very clean, horizontal glass plate. The thickish film is allowed to become perfectly dry, and has only to be dipped in water to loosen it from the glass. Coat the picture film with a little alcohol in which some resin is dissolved, and place above it the film formed in the way described above, press the negative and the film together, and leave them to dry. Then place the plate in water and the whole film will become loose of itself.

Roger Laurent.

NOTES ON PASSING EVENTS.*

By a Peripatetic Photographer.

I wish Mr. Winstanley had been present at the last meeting of the Edinburgh Photographic Society to have entered his protest against the hearty cacchination evoked by Dr. Nicol's *reductio ad absurdum* of his (Mr. Winstanley's) method of getting rid of the alcohol and ether in the bath. At the close of the meeting one gentleman tendered as an excuse for the emotion he displayed the fact of the popular story of "Mrs. Somebody" flashing across his mind as a case in point. This lady having, on one occasion, had the misfortune to swallow a fly, acted upon advice tendered and tried to get rid of the intruder by swallowing a spider, followed in turn by remedial measures of a progressively severe character, culminating in the dog that was swallowed as an appropriate means of eliminating the cat which was the preceding agent on the list. There are many remedies prescribed for photographic evils which are far worse than the diseases with which they are intended to grapple.

Among the recent "Answers to Correspondents" in this Journal there was one respecting the genuineness of a certain lens, and an offer to pronounce an opinion on the instrument after examination. It has frequently been to me a subject of surprise that more forgeries of lenses are not committed than appears to be the case. One can imagine that little difficulty would be experienced in imitating the brass mounting of a lens, and still less difficulty would be met with in imitating the optical or lens portion of the objective; for it stands to reason that, if the imitator obtain the same kind of glass as that of which the lens to be imitated was constructed, and grind it to the same diameter and a precisely similar degree of curvature, the imitation will be equal to the original in *every* respect—good workmanship, of course, being assumed. But the carelessness and recklessness which characterise some forgers is truly astonishing, as is evidenced by the following incident, of the truth of which I am assured:—Owing to a fire, and a consequent heavy claim against an insurance company which was the result, the latter body, having some suspicions aroused regarding the large number of alleged valuable lenses that were destroyed or damaged, called in the services of a gentleman who was believed to be an "expert" in such matters. In the presence of all the parties concerned a large lens was handed to this gentleman, which he grasped with one hand, holding it behind his back, without apparently deigning an examination, while he put two or three questions respecting the stock. He then pronounced the lens to be an impudent forgery, treating the others in a similar manner. To the astonished policy-holder he gave no information as to the reasons for his decision beyond that he knew "a forged lens by the feel;" to the insurance officials he gave the *data* by which he had been guided, and which ultimately proved correct in every instance. But, as a set-off to this, I am aware of a case in which the maker of a lens (this applied to the glasses only) could not tell which of two was his own make and which the imitation, and this after having had a whole day during which to test both.

The intensely cold weather we have been experiencing of late leads one, whether he will or no, to think about the most appropriate way of warming his studio and laboratory. A little atmospheric gas stove was introduced a few years ago, a description of the same having at the time appeared in this Journal, in which the jets were brought to play upon an open-twisted mass of iron wire, which was thus brought to a red heat or nearly so. Having had one of these made in a rude way I find it is very convenient for warming a small room, but a point upon which I require a little enlightenment, and the discussion of which would prove of general interest and advantage, is the nature of the services rendered by the crumpled-up wire. Is it employed merely as a means of exposing a large heated surface to the atmosphere? or does the red-hot wire act in any way as a means of eliminating any smell that might otherwise be emitted? It may naturally occur to the mind that if the flame were projected right into the atmosphere without having to impinge upon the wires it would all be utilised in the most direct manner in heating the air with which it is brought into contact. If these wires really prove beneficial then I imagine that the principle by which they act, whatever that may prove to be, will be more effectually carried out by increasing them in every direction, laterally and perpendicularly, until the portion farthest removed from the flame is only a few degrees warmer than the atmosphere in the room. This subject is one well worthy of some investigation. It is said that the stove to which I have here made reference is patented, but this I imagine is a mistake; for, with a view to ascertain the principle involved in the wires of which I have spoken, I have searched through the patent books for several years back without discovering anything of a similar description.

* Concluded from page 6.

THE PROGRESSIVE RESULTS OF THE PAST SESSION.

[A communication to the Edinburgh Photographic Society.]

In consequence of certain statements made, I think it right to say that it ought to be thoroughly understood that this Society is not, and ought not to be, in any way held responsible for the opinions advanced and statements made in such papers as may be read before the members. I am aware that it is held by some that what they call "silent acquiescence" should be taken as consent; but it is well known that there are often members present who have such a disinclination to speak that they will, rather than contradict a statement, quietly let it pass, although they may be perfectly satisfied that it is not correct. The Society, therefore, ought not to be considered responsible for anything unless it has in some way been put to the vote or been the subject of an express declaration from the chair.

I am sorry to say that year by year this annual paper on *The Progressive Results of the Past Session* is becoming much more difficult to write, as every year the amount of real progress is becoming less and less, so that, unless things take a turn for the

better, a simple report of "*in statu quo*" will be all that shall be left for me to do.

But, although there has during the past year been little that can be called real progress, it is gratifying to be able to say that there has been no retrogression, and that, although no really new process or method of working has been discovered, the old and well-tried systems have had much that was useless and superfluous weeded out of them, and some things that are new and useful added.

First in importance, although not in chronological order, is, I think, the great measure of success which has attended the exhibition of the London Photographic Society, as it indicates a state of matters that cannot fail to have an influence for good on the art generally. I do not refer to the financial success of the late exhibition, although that is a matter for congratulation far beyond the bounds of the Society itself, but to the triple fact that the collection, taken as a whole, showed a very decided improvement in photography from an artistic point of view; that it received at the hands of the press an unusually large amount of favourable notice, which cannot fail to exert a powerful influence on the public mind; and that there was on this occasion an entire absence of that petty jealousy and want of harmony, which in some previous instances were so painful to those who had the success of photography so much at heart. The great value of photographic exhibitions—in which the best works of the best workers being brought together act as powerful levers for the advancement of photography as an art—is almost universally admitted, and therefore I hope that the success of the last exhibition in London will stimulate and encourage other societies throughout the country to go and do likewise.

Those who claim for photography a high position as an art are equally ready to admit that the photographer depends to a large extent for his comfort and his success on the perfection of the mechanical appliances which are at his disposal; and, as the laws of supply and demand obtain in this as in almost all other things, we may take it for granted that he is fairly satisfied with the degree of perfection already attained, as, so far as I can remember, only two pieces of apparatus have been introduced, and they are both simply modifications of older tools. Curiously enough they have both the same object in view—the changing of sensitive plates in the field. The first is Aird's camera, of which I have already spoken well at former meetings, and which after longer experience I still very much admire; the second is the changing-box and slide introduced by Mr. George Hare, which I had the honour of exhibiting before this Society, and which I understand is very much liked by all who have used it.

Landscape photographers have long wished to find a substitute for glass, and many experiments have been made with a view to supply the desideratum; but I know from experience that they are slow to take a hint, and will not move till they see the matter actually carried into practice.

In The British Journal of Photography for June 19, 1874, the Editors published a method by which a very sensitive film could be easily made on a paper support; but, although I know that excellent results could be obtained in that way, I doubt whether a dozen operators ever gave it a fair trial. Exactly a year later Mr. L. Warnerke brought the subject before a meeting of the South London Photographic Society, and gave full details of a process almost identical; but I doubt whether, even although he shortly afterwards offered the tissue for sale, those for whose benefit it was first described have taken kindly to it. There are, I think, two causes for this apparent apathy:—Those who might wish to prepare the tissue themselves are likely to be frightened by the idea of the six or eight coatings of rubber, &c., that he seems to recommend; and those who might prefer to buy it ready prepared may not unnaturally think the advertised prices absurdly high. Judging from a pretty intimate acquaintance with the photographic fraternity, and a fairly-good knowledge of their wants and wishes, I believe, now that emulsions which will keep indefinitely are both easily made and readily found in commerce, there is money to be made by anyone who will manufacture a tissue consisting of tough paper coated first with rubber and then with gelatine, ready to be cut into suitable sizes, and coated with the sensitive emulsion when required. Such a tissue need not cost more than twice the price at present charged for albumenised paper, and I feel confident that it would meet with a ready sale.

Sensitive emulsions continue to gain in public favour, and, although nothing really new has been discovered, some little light has been, during the course of the year, thrown on several doubtful points. Mr. M. Carey Lea, to whom photographers are indebted for many useful hints, has given the question a good deal of attention, and early in the year published a modification of Mr. W. B. Bolton's method, which, in his opinion, constituted it not only a "new process," but one he might have patented with advantage. The modification consisted in the addition of a trace of iodide as well as the bromide, and in the application of an organifier to the moist pellicle. For the emulsion so made Mr. Lea claimed a very high degree of sensitiveness, and was altogether so well pleased with it that he said he did not think he was ever likely to use anything else. Whether he continues to find it all that was claimed I do not know, but so far as I can learn it has not taken on this side of the water; and I must confess that I could not see, so far as my own experiments went, any advantage from the use of the iodide.

From foreign sources we continue to hear a good deal of M. Vidal's polychromic pictures; but, remembering the enthusiastic way in which the copies that reached this country were spoken of, and what they were when I saw them, I cannot help regarding with some doubt the statements at present made. I feel very much disposed to ask why, if they are all that is now claimed for them, we do not get an opportunity of judging for ourselves as to their merits.

Something in the same line, or, rather, something aiming at similar results, has recently been introduced by Mr. W. B. Woodbury, and, judging from the only account that I have seen—that published in The British Journal of Photography for November 19—it is likely to be a success. I hope shortly to be able to bring specimens for the examination of the members, and till then shall say no more on the subject.

Passing from processes to manipulation I may say that the only novelty about which much has been said is the "Lambertype" in its various phases. Most of you know how hot the discussion as to the validity of the patents has been, and, I have no doubt, hold your own opinions on the subject. For myself, I hold that the patents are not worth the paper they are written on, and yet I think that the licensees get full value for their money. The fact is that, after examining the pictures and seeing the process carried on, I honestly believe that the little "dodges" and "wrinkles" communicated by M. Lambert or his agents cannot fail to enable those whom they instruct to produce most admirable work; and you must always remember that every year it is more and more becoming a fact that the man who does the best work will be the most successful.

You are aware that for a long time it has been a favourite practice for those with plenty of time at their disposal to print in fancy backgrounds along with figure subjects. This required both care and taste, even with the most simple methods; and some time ago Mr. Tilley, of Stafford, announced to the photographic world that he had discovered a new method of doing this, and afforded no little amusement by naïvely requesting everybody who had an idea of their own to send to him that he might see whether his was really new before patenting it. Well, nobody seems to have hit on his method, and in September last the specification was published, and it really turned out to be a most ingenious notion, but whether it will ever be more is quite a different matter. He photographs the sitter with a black background, places a transparency of a landscape immediately in front of the sensitive plate and a white background behind the sitter, cuts off all the light from the sitter by curtains or otherwise, and gives a second exposure. In this way the light from the white background passes through the transparency and makes a negative on the plate, except where the image of the sitter has been already impressed, that portion being protected by the sitter, who is still in position, although there is no light reflected from him. Mr. Tilley deserves much credit for his ingenuity, but I am afraid that is all he is likely to get.

Mr. Vanderweyde, after showing how to improve or touch up photographs, and getting well paid for it, has turned his attention to how best to light the subject so as to need as little retouching as possible, the result being that he has patented a window the panes of which are placed at various angles so as to get the largest possible good out of the smallest possible amount of light. Judging from the drawings which accompanied the description I can only say that years ago we have seen something marvellously like it, and I believe that not many years hence Mr. Vanderweyde's window will be forgotten. The man who cannot do good work without some such fantastic dodge should turn his talents in another direction.

Although not directly photographic, probably the most important occurrence in connection with photography throughout the year was the transit of Venus, in the observing of which photography was expected to play an important part. How far it has fulfilled the expectations that were formed I do not know, and not probably till all the measurements and calculations have been made shall we really know how far the efforts have been successful. Enough, however, has been done to show that photography has a wider and perhaps higher scope than the mere production of pictures; that it

is really an indispensable handmaid of science; and that it has a future before it more brilliant and more useful than its past, wonderfully brilliant and useful as that has been.

But photography has its humorous as well as its serious aspect; and it is well that it should be so. We are all better for a good laugh now and then, and I for one feel grateful to those who, either by accident or design, furnish occasionally the much-needed relaxation. But I have already occupied so much of your time that I shall only give one or two examples, and hope that those of our facetious friends whom I have not time to notice will excuse me, and I shall remember them on a future occasion.

Probably the finest piece of humour that has appeared during the year was in connection with some of the much-lauded nostrums by which the exposures were to be shortened one-half. It appeared in one of the journals in the form of a letter, intimating that the writer intended in future to do his work without exposing at all, as he intended to purchase two of the secret processes, each of which reduced the time by a half, and so between them left time out of the calculation altogether.

The next, although deficient in humour, is not less amusing. Mr. W. E. Batho, in giving his experiences in connection with the albumenising of plates, tells us of a "circumstance" that he should "scarcely have suspected," and one that, I think, nobody else will expect, even after he has called our attention to it. It is this—that when we coat a plate with albumen, notwithstanding that with a view to keep it in its proper place we are careful to keep the back clean, it obstinately refuses to be controlled, insists on turning round the corner, and, bidding defiance to the law which Newton thought he had discovered, walks up the back half the journey the first time, still higher the second, and when left alone continues slowly to crawl up till it reaches almost to the top!

Lastly: Mr. D. Winstanley—I suppose by way of a little relaxation from his more serious work—perpetrates the wildest and, at the same time, the most successful joke of the year. He knows something of the troubles which the photographer has to bear from the accumulation of ether and alcohol in his bath, and also that they are generally cured either by boiling or precipitation; but he tells us that another, and presumably a better, method suggests *itself*. He is cautious, you will notice, and in a sense repudiates the idea of the suggestion coming from himself. Well, the fatherless bairn thus launched into the world *is* a "stunner." The alcohol is to be removed by the addition to the bath of such substances as it will dissolve; for example, vegeto-alkalies, resins, essential oils, &c., &c. The ether is to be treated in the same way with oily and fatty matter, phosphorus, certain saline compounds, and some organic principles, while a dose of gun-cotton will greedily take up the two when they are mixed together. In case this should not be quite clear to the minds of all present it may be well to supply a somewhat liberal translation, which may be read as follows:—When you find your bath in a state in which, I hope, you never find yourselves—too far gone from the effects of alcohol—and especially when, as is generally the case, it is accompanied by a quantity of ether as well, treat it to a dose of cheap salt butter, the ends of a number of lucifer matches, a squeeze of the rind of a lemon, a pinch of rosin, and a few tufts of gun-cotton. Shake well for a few minutes and filter, and—— well, I cannot say what is to be done next, but feel inclined to apply to the process *Punch's* celebrated lines in connection with the *papier moure*:—

> "I'd rather not try it on my cat
> If I could try it on another."

John Nicol, Ph.D.

FOREIGN NOTES AND NEWS.

Meeting of the Berlin Photographic Society.—The Groups, by Herr Karelin, of Nijni Novgorod.—The New German Law of Photographic Copyright.—The Dearth of Articles on Photography Considered as an Art.—A Simple Method of Preserving Eggs.—A "Dodge" for Pushing Trade.—M. Cordier's New Work.

At the last meeting of the Berlin Photographic Society Herr Schaarwächter showed a large number of groups and *genre* pictures, by Herr Karelin, of Nijni Novgorod, which Herr Möbeius had forwarded to him. These were the pictures spoken of at the previous meeting as having been obtained by means of a peculiar contrivance, by which great depths of focus is obtained without contraction of the aperture. The pictures having been carefully examined, the members present were unanimous in their opinion that the effects, though very fine, could be produced with a short exposure with well-known optical arrangements.

The President then reported as to the progress of the new copyright law; after which followed a long and lively debate upon Herr Winkler's proposal to start a widows' and orphans' fund, and a table of rules was finally drawn up and agreed to, by which every member of the Berlin Photographic Society, not over sixty years of age, might become a subscriber to the new fund on payment of an entrance fee. No further business of importance was transacted at this meeting.

The new act for the protection of photographic copyright was finally passed by the Reichstag, on the 13th December, as amended by the special committee. The protection afforded to an original photograph from unauthorised reproduction lasts five years from its publication, provided the name and address of the producer or transferee and the calendar year of its publication are printed either on the picture itself or on the mount. In the case of works appearing in numbers or volumes the five years' protection is reckoned from the day on which the last number of the work is published; so that if the publication of a work in parts lasted three years the first numbers would have eight years' protection. The reproduction of photographs for the ornamentation of boxes, covers of books, or any kind of manufactured article, as distinguished from a work of art, is not forbidden by this act—a provision against which photographers in all parts of the empire are protesting vigorously.

The *Mittheilungen* regrets the ever-diminishing number of articles in the photographic journals treating of photography from the æsthetic point of view. The reason of the decrease it takes to be not so much the decadence of true artistic feeling amongst the followers of the black art, as the reluctance of these gentlemen to take the pen, which of late years has been laid down for various reasons, or has been snatched by death from the hands of many of the experienced photographers who used to write on these subjects. Amongst those who have given up writing, from death or disinclination, it mentions Disderi, Max Petsch, Hartmann, Rejlander, Lake Price, &c. Its further remarks on the articles on art-photography which appear in American journals are far from complimentary.

The *Archiv* mentions that fresh eggs may be preserved by rubbing them with linseed oil. After being kept three or even six months some eggs treated in this way were found to have lost about three per cent. of their weight, and on being opened had quite the smell of fresh eggs. The principle of this coating is the same as the well-known butter preservative, but the linseed oil being more liquid a quantity of it would be likely to go farther than the same quantity of butter.

A travelling photographer in Germany has fallen upon a rather ingenious plan of pushing trade. He calls at the various schools in each new neighbourhood, and offers to take a group of the children with the teacher occupying a conspicuous position in the centre. He then finishes a print which he presents to the teacher, who in turn shows it to his pupils. Every pupil becomes eager to possess a copy, and subsequently many of the children's parents are induced to sit to him, so that eventually the wandering photographer is far from a loser by the schoolmaster's presentation copy.

Le Moniteur is publishing, weekly, copious extracts from M. Cordier's new work entititled *Les Insuccès en Photographie*. This publication, as the title explains, treats of the causes and cures of the different forms of failure met with in the course of photography, and from the extracts we have seen promises to be of the greatest use to those who require advice in such matters. One series of articles is devoted to the testing of the various chemicals employed, placing in the hands of those who require it a ready method of verifying the purity of the products supplied to them. In the extract from this series are treated alcohol, pyroxyline, nitrate of silver, sulphate of iron, acetic and pyrogallic acids, cyanide, hypo., and chloride of gold; in addition full directions are given for testing the suitability of water for photographic purposes. Next we have an able disquisition upon the failures connected with printing, with directions for preserving the paper both before and after sensitising, and also instructions for the proper management of the various solutions employed.

Our Editorial Table.

Studies from Nature. By S. Thompson. Part V.

London: Sampson Low, Marston, Searle, and Rivington.

We are not aware whether it is intentional on the part of the author, or owing to a whim of the printer of the photographs, that a uniform tone

is not adhered to in these "studies;" but, from whatever cause, we think it is not desirable that when four pictures are placed together they should be of different tones. The otherwise good effect of the illustrations of Part III. was marred by this want of uniformity, for which there is now no existing necessity, inasmuch as the prints are executed by a process the tones imparted by which are entirely under the control of the person who mixes up the ink. This defect exists, although in a diminished degree, in the number before us, the tone of the *Breaking Wave* being a velvety black, while the others are, respectively, violet and brown. All are in themselves sufficiently pleasing; but, unless there be some special motive, which we cannot discern, for acting otherwise, it would be better, in our judgment, if no great disparity in the tones were permitted. The view *On the Mole* is one possessing much attractiveness. The *Mole* is a stream which has afforded as many (probably more) delightful "bits" to photographic tourists as any of the numerous and beautiful streams in Surrey. The view here presented is taken at Boxhill. *The Foreland, North Devon,* as indicated by its title, is a marine subject. On a dry beach forming the foreground a small schooner of the humbler class of our specimens of marine architecture is seen drawn up receiving or discharging her cargo of merchandise. In the immediate vicinity a narrow river runs past, rendering apparent the fact that when the tide rises the little vessel will have a channel quite sufficient to enable her to reach deep water, seen at no great distance in the background.

MAGIC LANTERN AND DISSOLVING VIEW PAINTING.
By CHARLES MIDDLETON.
London: BRODIE AND MIDDLETON.

THE first thing apparent on the perusal of this *brochure* is that the author is thoroughly acquainted with his subject. We judge of this by his manner of speaking of small matters of detail which would have been passed over by a mere theoretical writer. This manual differs from any of similar aim that we have seen, the illustrations being coloured, and executed in chromolithography. The instructions for applying the colour are clear and practical.

THE PHOTOGRAPHER'S POCKET ALMANAC.
Published by D. H. CUSSONS AND CO.

THIS little almanac, which has been published continuously for several years, forms what may be termed an illustrated price list of those "posing" and other chairs and apparatus in connection with the manufacture of which this firm is so well known. The "illustrations" consist of two nicely-printed Woodburytype photographs.

Meetings of Societies.

LONDON PHOTOGRAPHC SOCIETY.

THE usual meeting of this Society was held on Tuesday last, the 11th inst.,—Mr. James Glaisher, F.R.S., President, in the chair.

In anticipation of the approaching annual meeting Messrs. Heavyside and Murray were appointed auditors of the accounts, and Messrs. Murray, Wilkinson, Bird, Dunmore, Bool, and York scrutineers of the ballot papers in connection with the election of members to fill the vacancies arising in the vice-presidency and council.

Colonel Stuart Wortley then read a paper entitled *On Some Photographic Matters.* [See a sub-leader on this paper.] At the close of the paper he exhibited a frame for holding carbon tissue, and another frame on which to place the plate upon which the carbon tissue was laid when subjected to the action of the "squeegee."

Mr. SPILLER (referring to sulphate of silver, which Colonel Wortley had proposed to be used in connection with emulsions) said he did not understand from the paper whether the sulphate was to be employed as a sensitiser, and by itself, or to be used as an addition to the bromide of silver.

COLONEL WORTLEY explained that it was to be used along with the bromide.

The Chairman conveyed the thanks of the Society to Colonel Wortley for his paper and the exhibition of the frames.

Lieutenant F. T. PALMER said he would ask whether the members had seen articles in the photographic press lately on the desirability of attaching to future exhibitions of the Society a room or rooms for apparatus, and if it were the intention of the President and Council so to do. The boon to photographers, both amateur and professional, by so doing, he felt sure, would be very great indeed, especially to visitors from the provinces; for he saw by the list of members of the Society that more than one-half were non-residents in town. He thought he was well within the mark when he said that, at least, one-half the visitors to the exhibition were the same, and in a large number of cases did not come to town often. Every one interested in photography must feel what great benefits might be derived from seeing a collection of all the latest novelties in apparatus, with full descriptive labels attached, without the necessity of going from one end of London to the other looking for a certain photographic something that might be turned to account in his own practice. Few men who had been engaged in their art for any length of time but had been led to purchase, from descriptive advertisements, articles which, when tested, had been found utterly worthless for their work or no improvement on that which they already possessed. One hour spent amongst such a collection to a thoroughly practical man who knew what he required would be of much greater value than reading twenty articles regarding the same. But he would suggest that the apparatus sent should have some novelty about them, and not merely superiority of workmanship. Objection would, no doubt, be made to such an addendum to the exhibitien as derogatory and appertaining to shop, but the object of the Society was to instruct, and what better instruction could be given than to make those interested in the art acquainted with the advantages of a recent innovation or novelty? The exhibition would reap the benefit in after years by having finer works on the walls, for his own practice assured him that to do first-class work good implements must be employed. And if a really useful article were shown not only would the fraternity reap the benefit but the exhibitor, by the publicity it would obtain. There was also a rule which disallowed coloured pictures of all sorts to be admitted, but there was one class of them which ought, he considered, to be not only admitted, but really sought after by the committee of management. He alluded to photochromatic prints, and all those by which the colour was applied by mechanical means. Not only would they be well received by the fraternity, but would bring forcibly before the public, and let them see for themselves, what giant strides their art was making towards being a popular illustrator.

The PRESIDENT said that while it would have been better had the suggestion been made to the Council, still it afforded him great pleasure to see the interest taken in the welfare of the Society and its exhibition by the members, and the subject would receive their consideration.

A paper by Captain Waterhouse, of India, *On the Action of Eosine on the Photographic Spectrum,* was then read by the Secretary, who stated that he had received it only a few hours before coming to the meeting.

After some remarks by Mr. SPILLER and the SECRETARY,

Mr. WARNERKE said that he had tried many experiments in staining the collodion film, but he was unable to testify to the soundness of the theory put forth by Dr. Vogel. Speaking of the desirableness of employing other salts of silver than the iodide or bromide, he observed that he had been trying experiments with the fumarate of silver, and had found that salt exceedingly sensitive to orange light. It had been introduced into collodion and used as an emulsion, no bromide being present.

The CHAIRMAN alluded to the fact of certain colours like those of nature having been obtained by Dr. Diamond and the late M. Claudet when taking collodion positives; but they were accidental, and could not be obtained when desired. He proposed that their thanks should be conveyed to Captain Waterhouse for his paper.

Mr. H. DIXON then read a paper, in which he gave an account of his experience in photographing the officers, men, ships, and appliances connected with the Arctic expedition. This assumed the form of a dissolving-view exhibition of the photographs which had been taken, the exhibition portion of the entertainment being managed by Mr. F. York, while Mr. Dixon officiated as lecturer. The pictures were excellent, the explanatory lecture was concise and satisfactory, and the projection of the pictures on the screen all that could be desired.

The CHAIRMAN, having expressed the pleasure they had received from the illustrated narrative of Mr. Dixon's experience, thanked that gentleman for his interesting paper and exhibition.

Attention was then directed to a well-stocked portfolio of views by Lieutenant Palmer which were on the table, most of these having been taken in India. From a hasty glance over this collection we were much impressed with the great artistic, as well as manipulative, skill possessed by Lieutenant Palmer.

At an early stage of the evening's proceedings the Chairman intimated that the future meetings of the Society would, in all probability, be held at the Gallery of the Society of Artists in Water Colours, as all arrangements for that purpose had been made by the Council, and it only remained for the agreement to be signed. The proceedings were then terminated.

EDINBURGH PHOTOGRAPHIC SOCIETY.

THE third ordinary meeting of the session was held at the Hall, 5, St. Andrew-square, on Wednesday evening, the 5th inst.,—the President, Dr. Thomson, in the chair.

The minutes of the previous meetings were read and approved, and Messrs. James Macfarlane, John Oswald, E. P. Moffat, W. G. Ross, and John Walls were admitted ordinary members.

The PRESIDENT wished the members a happy new year, and said it was a matter for congratulation that such a large number had turned out at a season when there were so many social attractions elsewhere. He

thought it might be regarded as a favourable omen, and had no doubt the year on which they had entered would be quite as successful as that just closed.

Dr. John Nicol then read a paper on *The Progressive Results of the Past Session* [see page 17], on the conclusion of which

The President said he was quite sure that all present would agree with him in saying that they had listened with much pleasure, as they always did when Dr. Nicol brought anything before them. He thought those annual papers were particularly interesting, as they presented in a very small compass everything of any consequence that transpired throughout the year.

Dr. Nicol then brought up his report on Mr. Smith's safety dipper, which had been remitted to him at the previous meeting. He said it would be remembered that, while the mechanical arrangements of the dipper had been much admired, there were some of the members who had doubt as to its action on the bath, in spite of the soaking in a solution of silver, as recommended by Mr. Smith, and he had been asked to put the matter to a practical test. It would also be remembered that the dipper, when shown at the last meeting, was clean white wood—in fact, planetree. Mr. Neilson had soaked it in an old bath for some hours, and then used it for a week in his ordinary work, during which time there was no appearance of injurious action on the bath. It was then handed to him (Dr. Nicol), and he had prepared a new bath of twenty ounces for the preparation of lantern pictures, in which, as they all knew, it was essential that perfectly clean work should be made. In that bath the dipper had remained for three weeks, and, with few exceptions, several pictures had been taken every day—the last quite as good as the first, and all quite free from the slightest indication of injury to the bath.

The dipper was again handed round the table and very much admired, several members remarking that it would also answer admirably as a developing-holder.

The next business was the consideration of a question from the "box," concerning "the nitrate bath and its treatment."

The President said he thought simplicity was much to be desired in all photographic operations, and that he believed that baths suffered more from too careful nursing and too much treatment than from real work. In making up a new bath he used the ordinary commercial nitrate of silver, and simply dissolved it to the extent of thirty-five grains per ounce in distilled water. As a rule he found it sufficiently acid to slightly redden litmus-paper after the lapse of five or ten minutes. He then coated a plate with collodion and left it in the bath for a few hours, when it was ready for use. As a rule he never touched the bath in any way, but exposed it to sunlight as often as possible, and it rarely got out of order. When too fully charged with iodide of silver he added an equal bulk of water and filtered, then reduced it by evaporation to a third of the whole, when he generally found it all right again.

Mr. Mitchell said he, some time ago, had a bath in the state known as "sandy," and every negative sensitised in it was covered with a gritty deposit and very small pinholes. It was laid aside for some time, but on adding to it a solution of nitrate of barytes, as recommended by Mr. A. L. Henderson, it was completely cured, and had done good work ever since.

Considerable discussion followed, but nothing new was elicited, except that boracic acid instead of either nitric or acetic acids had been found advantageous.

Dr. Nicol then called attention to a print of the interior of *Beverley Cathedral* that he had got from the Hon. A. Erskine, which, he said, upset at least Edinburgh notions of dry-plate work altogether. It had been taken on a gelatine dry plate with an exposure of a minute and a-quarter—less than a hundredth part of what he was sure would have been required by the plates he was in the habit of working. He knew that Edinburgh amateurs had not succeeded well with the gelatine emulsion; but he saw the Rev. J. H. Palmer in the room, and as he knew that he had been a successful gelatine worker, he was sure the meeting would be glad to hear anything that he might say on the subject.

The Rev. Mr. Palmer introduced himself as a missionary of gelatine, on account of the excellency of the results which it gave, its cheapness, rapidity, and general trustworthiness, and he hoped soon to hear that baths were altogether discarded. At first he encountered considerable difficulties, but now he hardly knew what failure was. The picture exhibited was probably taken with what was called rapid pellicle; but that he did not advise the members to try—at least at first—and assured them that they would find the slow variety rapid enough. That was the kind which he now always used; and to give an idea how quick it was he might say that in his own church, which was very dark from stained glass, he required to expose wet collodion an hour and a-half, while on plates prepared with the slow gelatine pellicle prepared by Mr. Kennett he got an equally good negative with an exposure of half-an-hour. He might add that he had found no difference between pellicle prepared by himself and that supplied by Mr. Kennett. He had been in communication with Mr. Willis—who had worked the rapid gelatine very successfully—and he told him that much benefit was derived from soaking the plate for some time previous to development in a twenty-grain solution of bromide of ammonium. His own practice was to soak an eighteen-penny box of pellicle in two ounces of distilled water, and then dissolve it in a water bath. The fluid emulsion ran as easily as collodion over a small plate, and was poured on and off in the ordinary way. When the plate was large the emulsion required to be spread over it with a glass rod, and he then poured on and off a quantity to ensure an even coating. Plates so coated were laid on a perfectly level shelf for a short time to set, and then reared up to dry like an ordinary plate. In the present state of the atmosphere the film took much too long to dry spontaneously, and got injured if so left. He had, therefore, got a very cheap and useful paraffine stove, which he lighted in his dark room, and if the plates were prepared at night they were found to be quite dry in the morning. Instead of a bottle, he had found one of Clark's night lamps, or "infants' food-warmers," very convenient, both for keeping the emulsion fluid and pouring it on the plates. Regarding development he had nothing particular to say—it was the ordinary alkaline method; and although that frequently gave sufficient intensity it did not always do so. He got density to any extent with the chloride of copper method that had been published some time ago. After fixing and washing, the negative was immersed in a bath containing about half-an-ounce of chloride of copper in six ounces of water, and left till the image disappeared. It was then washed and redeveloped with pyrogallic acid and ammonia, which gave any required degree of density.

Mr. Pringle said that he had seen Mr. Palmer make some experiments with the gelatine plates in their establishment that day, and when exposed side by side with wet collodion they were at least quite equal in sensitiveness.

Mr. Ross said that since the days of the daguerreotype he had seen nothing so extremely delicate and beautiful as the image on the gelatine film, and he had no hesitation in saying that if a tendency to fog, which was unmistakably evident, could be evercome he should prefer it to albumen, collodion, or anything else that had been introduced.

The Rev. Mr. Palmer remarked that the plates which had been used that day in the presence of Messrs. Ross and Pringle had undoubtedly been injured by light; but he had sent for a supply of Kennett's pellicle, and hoped before he left Edinburgh to show that the tendency to fog was accidental.

Mr. Turnbull said he had tried the gelatine emulsion, both wet and dry, and, although under somewhat disadvantageous circumstances, he had seen enough to convince him that it was much better than any other kind of emulsion.

A distribution, by lot, of a number of fine pictures, contributed by Mr. Matheson, was then made. The usual votes of thanks were then given to Dr. Nicol, the Rev. J. H. Palmer, and Mr. Matheson, and the meeting was adjourned.

Correspondence.

The Albumen-Tannin Preservative.—Photo.-Mechanical Printing.

About a year ago I sent you a description of a preservative solution in which I endeavoured to combine the useful effects of albumen with those of gum, tannin, and gallic acid. The tendency of the tannin to coagulate the albumen was held more or less in check by the gum. Different experimentalists obtained very different results as to the amount of coagulation. With some the mixture was quite milky; with others only slightly opalescent. In my own hands the mixture was only opalescent with the materials I then had in use. Since then I have had all degrees up to quite an opaque milkiness. But these various results have no bearing on its action; it is equally useful whether only faintly opalescent or very milky. It was, and remains, the very best preservative that I have been able to find, whether for plates treated with preservative after coating or for washed emulsions; and since I first found it I have used it exclusively. This has not, however, prevented my making comparative trials with other preservatives; for if I could find anything better I need scarcely say that I should abandon it in a moment.

The praises I have seen bestowed on the beer and albumen process led me to give it a very careful trial. As it combined the use of albumen, which I would not willingly give up, with certain alleged qualities of great value, I thought I might very likely find it better than my own, and, if so, I intended to adopt it for permanent use. I accordingly tried it very carefully, taking, of course, the precaution to treat the ale with nitrate of silver to remove chlorides (which were present in abundance). I found it give clean and good plates, but the exposure needed was from two to three times as long as with my own preservative. I had added some gum to the mixture of beer and albumen, because I have always found that gum is necessary where the highest sensitiveness is desired.

In speaking of gum as a preservative a word seems needed on the matter of *blistering*. Some fault has been found with this substance for its tendency to cause blisters. Several years ago I mentioned in your columns that sugar prevented the blistering. Sugar has been very generally used in connection with gum, and probably those who have been troubled with blisters have either neglected to use it or have used too little. At one time I used equal weights of both; afterwards I

found this proportion of sugar too large, and reduced it by degrees to one-fourth. It does not, however, follow that this small proportion will be sufficient in all cases, some pyroxylines apparently needing more than others.

It seems not unlikely that the varying degrees of opalescence obtained with the preservative first referred to in this communication depend upon variations in the character of the gum used. That the gum has everything to do with the action is rendered sufficiently apparent by adding together the other materials without it, when a thick curd falls and the mixture becomes worthless. With continued use I have slightly altered the proportions, and give below those I now employ:—

Water	6 ounces,
Acetic acid	3 fluid drachms,
Gum and sugar solution	4 ,, ,,
Prepared albumen	1 ounce,
Sixty-grain gallic acid solution	4 fluid drachms,
,, ,, tannin solution	2 ,, ,,

to be added strictly in the above order. The acetic acid I use is of the regular commercial strength sold here—probably one drachm, or a little less, of glacial acetic acid should be used. The gum and sugar solution is made by dissolving half-a-pound (avoirdupois) of best gum arabic and two ounces of sugar in forty-four ounces of water, adding one and a-half fluid drachm of good carbolic acid; the prepared albumen by shaking up whites of eggs with an equal bulk of water and adding three drops of glacial acetic acid to each ounce of the mixture. The shaking should be done in the usual way, together with sharp fragments of glass in a strong bottle; then filter through a tuft of cotton. The gum solution keeps indefinitely; it turns reddish by age, but is none the worse.

It is rather curious that precisely in the same way that gum checks coagulation by tannin it does also by carbolic acid. The carbolic acid added to the gum solution to make it keep has no power of sharply coagulating the albumen, as it would do in the absence of gum. Several years ago I noticed the energetic power of carbolic acid to coagulate albumen, and thought of publishing it in the chemical journals as a valuable test. Before doing so, however, I made a careful series of comparative examinations between its efficiency and that of nitric acid—the substance ordinarily used. I concluded that, though equally effective, carbolic acid had no real superiority, and, therefore, it was not worth proposing as a substitute. Since then this suggestion has been made by others.

I have recently received, by the kindness of the Belgian Photographic Association, their monthly journal with many very interesting illustrations of different photo-mechanical processes. One of them contains a reproduction by M. Rousselon after a painting by M. Lambert. It is exceedingly well done, and gives great promise for the wide extension of this beautiful method. It is one of those in which grain is produced by the introduction of a fine metallic powder into the gelatine and bichromate mixture. The effect is as beautiful as that produced by the Woodburytype process, and yet quite different. That these photo-mechanical methods are destined to revolutionise the system of book illustration is sufficiently evident. Photographs have, moreover, already deeply modified public taste. There was a sort of line engraving largely used a generation ago for views and architecture which produced the most perfectly flat effects conceivable, and yet was tolerated and liked. Scores of quartos and folios filled with these illustrations, and representing all the public buildings and favourite views of Europe, were published and, wonderful to relate, sold. They would not find acceptance now.

Philadelphia, December 23, 1875. M. Carey Lea.

January Meeting of the Photographic Society of France: Forthcoming Photographic Exhibition at Paris; a Prize of £40 for the Best Dry Process; *Conversazione* on Mr. M. Carey Lea's New Process; A Generous Photographer; Silver Prints—Reproduction of Flowers; Very Fine Fatty Ink Proofs; Willis's New Platinum Printing Process—Experiments Before the Photographic Society of France, by Professor Stebbing; Enamelled Trays.

The Photographic Society of France held its monthly meeting on Friday evening last, the 7th inst.,—M. Davanne in the chair.

The meeting was poorly attended, probably on account of the weather being so bad, or that the holidays were not completely over. The conversation of the evening turned upon the forthcoming photographic exhibition, which will take place in the month of May next, at the Palais de l'Industrie, Paris. This exhibition will make the eleventh that the Photographic Society of France has taken under its patronage. As all the others rendered great service to photography, and were successful enterprises, we may anticipate that the next will likewise be a great success. If any of the readers of The British Journal of Photography desire to exhibit at that Exhibition it is necessary to write to M. Koziell, No. 20, Rue Louis le Grand, à Paris, stating the space they require. This must be done before the 10th of April next. M. Koziell will then forward a circular giving all information on the subject. Suffice it to say here that all objects to be exhibited must arrive in Paris before the 10th of April next. Let us hope that this exhibition will consolidate the friendship which honours both nations, and be the means of strengthening the fraternal bonds between English and French photographic artists. I am convinced that all the members of that profession in Paris will vie with each other in showing hospitality and rendering every facility to their *confrères d'outre-manche* in visiting their studios. Much useful information likely to advance the art to which they have dedicated their talents might be gleaned and imparted by such amicable intercourse.

The Chairman informed the Society that through the generosity of Le Ministre de l'Instruction Publique the sum of 500 francs could be added to the prize offered by the Society for the best dry-plate process. As this prize is open to foreign competition I will briefly state the principal requirements:—"A sum of £40 will be awarded by the Photographic Society of France to the author or inventor of the best dry process. The *desideratum* is the discovery of a preparation which can be preserved for an undetermined length of time, and which, when flowed over the glass or any other substance, would, by simply drying it (without washing), give a sensitised surface equal to wet collodion." As it is supposed to be very difficult to fulfil these conditions the Society have added the following modification:—"The prize will be given in part or wholly to the author whose process approaches the nearest to the conditions laid down."

Now, as our esteemed American colleague, Mr. M. Carey Lea, has published a mode of operation similar to what is required, the conversation turned naturally upon his process and the chance he had of obtaining the prize. Several amateurs said that they had experimented with the process without success. Why is this? Is it that Mr. Lea has not given his *modus operandi* in a clear and simple manner, imagining that all amateurs were, or ought to be, acquainted with chemical manipulations. I am rather inclined to this opinion after a conversation I have had with an amateur who had followed Mr. Lea's formula (given at page 173 of last year's volume of this Journal) to the letter. This was his experience:—I asked him how he had gone to work. He answered he had taken the given quantity of alcohol and dissolved in it the bromides and iodides, together with the chloride of copper; the addition of the latter salt gave him a precipitate which he could not redissolve, and which turned the whole of the solution of a disagreeable greyish-brown colour. When filtered he put in his cotton, then his ether, and carried out all the rest of the operations, in his opinion, according to Mr. Lea's instructions. After emulsifying he had a very good emulsion without sediment, but of a dark brown colour, the film of which gave no image. I told this gentleman that he should have added his cupric chloride after the silver, as was done by the Editors of The British Journal of Photography. [See volume xxii., page 182.] The question was then asked—"Why did Mr. Lea write the cupric chloride with the iodides and bromides if it were not intended to be mixed up with those salts?" I declined answering this question, feeling quite incompetent to do so, hoping that Mr. Lea would himself reply. An unanimous desire was experienced that Mr. Lea should publish his method of manipulating in a clear and able manner, and so oblige many of his admirers.

It must not be forgotten that another prize of £20 is offered to any one who can discover and make known a more rapid process than that now in use for the production of portraits, &c., in a studio. This prize is due to the generosity of M. Liebert, the well-known American photographer, residing at Paris, author of a very superior book on photographic art entitled *Photography in America*. [See advertisement in The British Journal Photographic Almanac, page cxx.]

M. Chauvigné, of Tours, sent some very fine specimens of reproductions of flowers printed in silver salts. A great sentiment of beauty was predominant; everything was artistically arranged in a manner to please the eye of a *connoisseur*.

M. Chiel presented a collection of very fine prints in fatty ink, which proves that this process is slowly but surely making its way in public esteem, thanks to the time and energy devoted to it by a few energetic men, among whom M. Chiel stands foremost. "A prophet is not without honour," &c., may truly be applied to this process. For many years it could not find a foothold in the country which gave it birth; but after its value had been recognised in foreign countries it returned home, as it were, gilded by foreign sanction and under such high-sounding titles

that our esteemed friend M. Poitevin, the inventor, could hardly recognise his own offspring. The admirable inventions of M. Poitevin—the father of fatty-ink, as well as carbon, printing—are now getting on in a very satisfactory manner, although they will, ere long, have to contend with another invention for the production of indelible proofs. I allude to Willis's new platinum printing process. This invention will, I am certain, render great service to photography. It has been worked under my inspection for the last six weeks, Mr. Willis having sent his operator over to Paris with the intention of giving publicity to his invention. I made a report to the Photographic Society of France on that subject last Friday evening, the tenor of which was as follows:—

"Gentlemen,—I intend this evening to fulfil the promise I made to you at your last meeting; that is to say, make a report and experimental demonstration before you on the production of positives on paper by means of a platinum salt—an invention of Mr. Willis, jun. Yesterday I had the pleasure to call on your honourable Vice-President to borrow a negative; this negative was employed today in printing a certain number of positives, which I shall have the honour in a few minutes to develope before you. The operator began to work this morning at nine o'clock, and at four o'clock only eight proofs had been obtained. I desire now to draw your attention to the conditions under which this printing had been executed. The light was exceedingly bad and the negative very dense. I beg M. Davanne to have the kindness to state approximatively how many proofs he himself would have been able to obtain in silver salts with that negative and with the feeble light of today."

[M. Davanne replied that, as the negative was made by Taupenôt's process, and at the same time was yellow and dense, he should probably not have been able to print more than one and a-half.]

"I have taken the liberty of putting this question, because I desired to show the rapidity of this process; for the great value in the present day of a new process consists, in a great measure, in the rapidity of its manipulation, for 'time is money.'

"The first operation required in this process is pasting the surface of Saxe paper with a paste made of arrowroot or fine starch. This coating has for its object to prevent the solutions from penetrating too far into the pores of the paper. When the paste is thoroughly dry the paper is floated upon a weak solution of nitrate of silver for two or three seconds and then dried. When dry the sheet of paper is laid flat upon a glass or wooden table, the four corners are held down by means of pegs or pins, and a small quantity of a mixture of ferric oxalate and chloro-platinite of potassium is poured upon it, and spread in an uniform manner over its surface by means of a sponge or a piece of flannel. The paper is now dried, cut up into a convenient size, and placed under negatives in the printing-frames.

"A sheet of paper was sensitised this morning in the above-mentioned manner, and the eight prints now before you were obtained under very unfavourable circumstances. As you can see, the image is barely visible. The platinum salt has not yet undergone any change whatever; but a chemical change has taken place in the ferric salt employed. The action of light has changed the ferric oxalate into ferrous oxalate, and in proportion to the quantity of light which passed through the whites and blacks of the negative, this last-mentioned salt alone having the property of reducing platinum salts into a metallic state when in presence of an oxalate of potash.

"In the enamelled tray now before you is a solution of potassic oxalate, which must be slightly warmed. In contact with this solution the proof, now barely visible, will flash out instantaneously, as the platinum salt has been reduced in a metallic form in proportion to the quantity of ferric oxalate which had been transformed into ferrous oxalate by the action of light. As you have seen, gentlemen, the eight proofs were developed in less than eight minutes before your eyes. The proofs are now left a short time in a weak solution of oxalic acid, which dissolves out all the untransformed ferric oxalate, and leaves the whites of the proofs very pure. After having been rinsed the proof is finished as far as concerns its permanency, but the tone is not very agreeable to the eye. To give it the charm and brilliancy of a silver print it is necessary to tone it in a solution of sulphocyanide of gold. It is here that the small quantity of silver previously put upon the paper plays an important part; it facilitates the toning, and makes the image lay, as it were, firm hold of the fibres of the paper.

"After this operation the prints are plunged into a bath of hyposulphite of soda, in order to eliminate any soluble salt which may have remained. The proofs are finally rinsed in plain water for about a quarter of an hour, and are then ready for mounting."

The members took great interest in the manipulations, and admired very much the series of proofs, as specimens, which I laid before them for examination.

M. Audouin presented to the Society a set of enamelled iron trays. These trays are punched out of a piece of sheet iron, after which they are enamelled by a new process. The enamel is so thick and so evenly laid on that there is no inconvenience in employing them even for the silver bath. They resist heat in a very successful manner. Several have been in use in my laboratory for the last six weeks without having deteriorated in the least.

3, *Place Bréda, Paris, January* 11, 1876. E. Stebbing, *Prof.*

THE COMPARATIVE AFFINITY OF THE HALOGENS FOR SILVER.

To the Editors.

Gentlemen,—In your remarks on page 4 of this week's issue, in reference to the controversy between Mr. H. J. Newton and the London correspondent of the *Photo. Times* you observe:—"We thought it had been proved, and was now generally accepted, that bromine took the intermediate place between iodine and chlorine, the former possessing the greatest affinity for silver." As I am one of those who do not accept this view, but maintain that silver is no exception to the ordinary rule of the chemical affinities of the halogen elements, viz., chlorine, bromine, and iodine, I should be obliged if you would kindly state as shortly as you can the reasons for the view you take.—I am, yours, &c.,

Liverpool, January 8, 1876. Wm. Robinson.

[Perhaps the best proof we can bring forward in support of our view of this question will be found in Mr. Robinson's own article at page 493 of our last volume but one. In that article it is shown that iodide of silver becomes amenable to alkaline development when a *very* strong alkaline solution is employed; while, on the other hand, a film containing chloride only cannot be satisfactorily developed, however weak the alkali may be, owing to the great tendency to fog arising from the readiness with which the halogen leaves the metal. This is, we think, proof positive. Let Mr. Robinson try the following experiment in order to prove the question of the comparative affinity of iodide and bromide for silver:—To an ordinary washed bromide emulsion (containing, of course, neither silver or bromide in excess) add a few grains per ounce of any soluble iodide; the immediate effect will be the decomposition of the bromide, which is shown by the "curdling" of the emulsion from the formation of iodide of silver, which clots together and falls to the bottom in coarse particles.—Eds.]

THE BEHAVIOUR OF HALOGENS.

To the Editors.

Gentlemen,—"Who shall decide when doctors disagree?" This is a question which continually occurs to me and, no doubt, to many others when reading the conflicting opinions of those who are entitled to be considered the "doctors," or expounders, of the science of photography, and never more so than on reading Mr. H. J. Newton's account of experiments with the chlorides apparently conducted by himself.

I will quote the dictum of the late Mr. Sutton, published in your Journal in 1871:—"Of the three halogens—iodine, bromine, and chlorine—iodine has the greatest affinity for silver and the least affinity for hydrogen, bromine next, chlorine last." This was, I believe, the general opinion, and on it was based the idea that chloride of silver should be more sensitive under the alkaline developer than bromide of silver.

But to return to the words "bromine next, chlorine last." We find Mr. Newton, as I understand him, holding an opinion the opposite of this. He says:—"Silver unites with bromine with much less vigour than with chlorine or iodine." I suppose that this is tantamount to saying that chlorine has a greater affinity for silver than bromine.

This latter theory—or fact, as the case may be—is upheld by the action of chlorine on bromide of silver, the chlorine ejecting the bromine from the bromide of silver and combining with the base. Thus we have an alteration in the order of the halogens' affinity for silver, the order being—iodine first, *chlorine next*, and *bromine last*. This, again, would account for chloride of silver being *less* sensitive than bromide of silver, instead of being *more so*, as was once supposed; at least, I have found this to be the case in trying chloride gelatine emulsion against a bromide one. (I would here remark that, from Mr. Newton's experiments, one is led to infer that it may be possible that different chlorides used in sensitising the emulsion may have a marked effect on the sensitiveness of the same. I used chloride of ammonium.)

If chlorine have a greater affinity for silver than bromine it has, also, as I take it, the same for hydrogen, as proved by chloride of silver being more easily reduced by the alkaline developer than bromide of silver.

Another phase of this question is embodied in the following:—How is it that chloride of silver should conduce to *clearness* of the negative when in combination with bromide of silver, seeing that it is more easily reduced by the alkaline developer? The only reason I can give is that, as Mr. Newton points out, "a chloride unites with the silver much more vigorously than a bromide," and thus *free silver* is more easily eliminated. The *chloride of silver* is, I suppose, not formed in sufficient quantity to cause fog, for I have found fog to be the usual accompaniment of chloride of silver and alkaline development when *collodion* has been the vehicle employed, and with that we have to do in the present instance, although the substitution of *gelatine* for collodion alters the case, and clean plates may be developed with a strong alkaline developer.

I read with great interest the statement that the chlorides of gold and platinum will, under certain conditions, increase the sensitiveness of the bromide of silver. I do not know whether Mr. Newton has been the first to publish this fact; but, in your Almanac for 1875, Mr. Spiller

mentions that "by treating pure chloride of silver upon paper with a dilute solution of the chloride of gold surfaces of extraordinary sensitiveness are produced." This was in connection with positive printing. I tried at the time to take advantage of this fact for increasing the sensitiveness of gelatino-chloride emulsion, but could not perceive any advantage, though, if I remember right, the plate did not develope clean.—I am, yours, &c., HERBERT B. BERKELEY.

Cotheridge Court, near Worcester, January 11, 1876.

EXCHANGE COLUMN.

Voigtlander's three and a-quarter-inch portrait lens will be given in exchange for a cabinet lens by Ross or Dallmeyer. Difference adjusted.—J. B., Post-office, Brora, N.B.

THE BRITISH JOURNAL OF PHOTOGRAPHY for 1874 and 1875 will be exchanged for anything of equal value.—Address, J. F. REEVES, Highbury Cottage, Russell-terrace, Leamington.

I will exchange a rotating chair, with head-rest, and a large pillar and pedestal, together with a half-plate Lerebours' lens, for backgrounds, interior and exterior.—Address, C. T. F., Photographer, Drogheda.

Wanted, Tissandier's *History and Handbook of Photography*, in exchange for Hardwich's *Photographic Chemistry*, third edition; also, Lake Price's *Manual of Photography*.—Address, S. ARLIDGE, photographer, Mount-pleasant, Kettering-road, Northampton.

Nine dozen superior microscopic slides, by good mounters, and Carpenter's 12s. 6d. work on the microscope, also Hogg's *History, Construction, and Applications of the Microscope*, cost 7s. 6d., in perfect condition, for offers in photographic apparatus.—Address, J. B., care of Mrs. Lockwood, 16, Buck-street, Leeds-road, Bradford.

A first-class new mahogany lantern, three and a-half-inch condensers, complete with every requisite for oil and oxyhydrogen light, interchangeable jets, rackwork, lever, comic slides, and chromotropes, nine feet fine linen screen, seven lbs. potassium chlorate, four lbs. manganic oxide, the whole having cost £12, will be exchanged for first-class photographic apparatus by a good maker, or a good turning-lathe suitable for instrument-making.—Address, J. B., care of Mrs. Lockwood, 16, Buck-street, Leeds-road, Bradford.

ANSWERS TO CORRESPONDENTS.

PHOTOGRAPHS REGISTERED—

W. Vick, Ipswich.—*Two Portraits of T. C. Cobbold, Esq., M P.*

J. Shaw, Stockport.—*Photograph of Drawing of a Proposed Tower and Observatory.*

G. Higginson, Southport.—*Portraits of Walter Smith, Esq., the Mayor of Southport, and three Photographs, entitled, respectively, Spring, Summer, and Autumn.*

☞ *Correspondents should never write on both sides of the paper.*

G. F. R—There has been some misapprehension; sulphuric acid will not produce such a precipitate.

EIN FRAGER.—1. The proportions stated will make an efficient studio. It would certainly have been an improvement if the width could have been extended; but we know that much high-class work is done in studios of less dimensions.—2. If you have a clear look-out to the north it may be as well to confine the glazing to that side.—3. Glaze the whole length with the exception of six feet at each end, the glass to reach within about thirty inches of the floor.—4. Plain glass for the roof and corrugated for the sides. Let the squares be as large as you possibly can.

HENRY.—This correspondent says:—"Will you kindly tell me, in your 'Answer to Correspondents,' the best thing to do with my lens? It has become partly uncemented, and air must have got between them, causing long, transparent-looking bubbles, something like frost upon windows."—— The effect described is caused by the over-drying and shrinking of the balsam. The most effectual way of dealing with the evil is to have the lens removed from its cell and placed in a little warm water, the temperature of which must be gently raised until the balsam melts, which will be ascertained by the ability to slide the crown from off the flint element of the lens by pressure with the fingers applied obliquely. Clean the contact surfaces by means of collodion, ether, or benzole, and apply a large drop of fresh balsam to the centre of the concave surface. Next apply the crown glass lens with gentle pressure until the balsam exudes all round the edges; tie together with a bit of thread passed across in various directions, and apply a gentle and rather long-continued heat until, upon cooling, the exuding balsam feels hard. Then clean and remount.

EDINA.—The information you received concerning our having taken a sharp negative of an engraving during a slow motion is quite correct. It was taken by means of a flashing light of great actinic power. You may repeat the experiment in the following manner:—Mix together—

Chlorate of potash	8	parts.
Sulphide of antimony	4	,,
Sulphur	2	,,
Magnesium	2	,,

Each of these must be quite dry and in a state of fine powder before being mixed. The magnesium must be in the form of filings, or powder, the same as when employed for use with Larkin's lamp. If these ingredients have been well mixed together by means of a paper-knife (avoid doing so in a mortar, with a pestle) they will, on application of a light, ignite with such instantaneity and intensity as to admit of a portrait being taken before the sitter has had time to give the start or even the wink which invariably follows such an ignition.

"CADMUS" writes:—"Will you allow me to inquire through your columns if Mr. Viles will kindly state where the pure sheet india-rubber may be obtained which he describes in his paper read a few weeks ago. It is highly desirable to reduce the weight of the silver bath, and the emphatic testimony which he bears to its suitability for that purpose induces me to write for the information.

G. W.—A correspondent writes to us a genial letter, all the more pleasant because it is on behalf of others; and, as there is a principle involved in it, we publish it *in extenso* with the object of attaching the explanation sought for. He says:—"I was amongst some friends in ——— at Christmas, and also amongst many photographers, one of whom asked me a certain question. I told him I was not well up in chemistry, and did not think I could answer it with certainty; but I told him I thought I could get you to answer, so that in future he might be able to understand it. I explained as far as I comprehended it, but he did not seem to see it. I will tell you the circumstance. He had a bottle that had a silver bath in it, and there were four ounces of silver in solution which contained 1,920 grains. This bottle was in a clean stone jar—one that would hold six gallons of water—but the servant, without seeing the bottle, poured into the jar two buckets of water from the tap (about four gallons), and the water being pitched in broke the bottle and the whole of the bath was mixed with the water. He wishes to know how many grains of common salt it will take to throw down all the silver in the form of chloride; also, he wishes to be informed how much hydrochloric acid it would take to do the same thing—neither more or less of one or the other. I told him the table was in your ALMANAC, but he said that he always looked on that table the same as he would on a book in French, of which language he knows nothing. He says there may be the table, but no explanation leading him to understand it, and he thinks there should be some examples showing how to understand that table—that is, for those, who, like himself, are unacquainted with chemical symbols, &c. I promised that I would get you to put the matter in a clear light in his own case, and then he would be able to understand all the other part of the table. I may just say that I have met with some dozens of photographers, who do not understand the meaning of the table referred to; perhaps if you were to make the thing clear in 'Answers to Correspondents,' it might be useful to many." ——In reply:—By innumerable experiments chemists have determined the exact proportions in which chemical elements combine to produce compounds, and these numbers or proportions are given at page 203 of our present ALMANAC, the two succeeding pages being devoted to the more important *compounds* used in photography. If the querist will turn to page 205 he will find opposite "nitrate of silver" the figures 170, and glancing a little lower down in the same page he will see opposite "chloride of sodium" (which is common salt) the figures 58·5, or 58½. The meaning of these figures, as applied to the present case, is simply this—that for every 170 parts (grains, drachms, or ounces) of nitrate of silver that have been dissolved in any quantity of water he must add 58½ parts of chloride of sodium in solution, by which the whole of the silver will be precipitated in the form of the chloride of that metal. If hydrochloric acid be used instead of chloride of sodium, then, on referring to page 204, the figures 36·5 are seen to be placed in juxtaposition, these indicating the proportions of this acid that must be used in the precipitation of the metal as a chloride. From the *data* here given our friend will easily, by a simple arithmetical calculation, ascertain how much of either substance he must employ to effect the desired end.

RECEIVED.—M. Carey Lea; E. B. Docker (Sydney, N.S.W.); J. B.; E Dunmore; Lindsay Howie; "Mark Oute;" F. J. W., &c., &c.

NEW PHOTOGRAPHIC APPOINTMENT.—Mr. F. Dann has been appointed photographer at the Chymical Department, Royal Arsenal, Woolwich, in the place of Sergeant-Major Shuckard, R.A., deceased. Mr. Dann has been eleven years employed in the Department.

AN INTERESTING ART GATHERING.—On Friday last, the 7th inst., the *employés*, numbering upwards of sixty, connected with Mr. Brown's (late Vandyke and Brown's) extensive establishments at Liverpool, were entertained by that gentleman to a ball and supper at his residence. The party was kept up with spirit until Saturday morning. Advantage was taken of the occasion to present to Mr. Brown a beautifully-illuminated address. The instruments used in the prosecution of art-photography are introduced very characteristically into the general design.

THE LATE MR. S. T. DAVENPORT.—We regret to have to announce the death of this gentleman, which took place on Friday last, the 7th inst., after an illness of only four days. Mr. Davenport was officer of finance in the Society of Arts, with which society he had been connected for thirty-three years. He acted in a similar capacity in connection with the London Photographic Society, at whose meetings his burly form was usually to be seen seated at the table in front of the President along with the representatives of the photographic press. Having served his apprenticeship to the profession of an engraver, all subjects connected with photographic engraving and typographic reproduction had special attractions for him, and our pages bear record to the fact of his having brought this subject forward in a prominent manner before the Society of Arts.

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THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 820. Vol. XXIII.—JANUARY 21, 1876.

ON THE COMPARATIVE AFFINITY OF THE HALOGENS.

Once more this subject is creating interest in photographic circles; but, in spite of all that has been previously written, very great diversity of opinion appears to exist in the minds of some of our correspondents as to the real order observed by the halogens in their affinity for silver. The late Mr. Thomas Sutton showed by experiments his reasons for holding that that order was an exact reversal of the behaviour of these substances towards the other metals—that, in fact, the most powerful affinity was shown by iodine, the least by chlorine, whilst bromine occupied the intermediate position.

Recently, however, Mr. H. J. Newton, of New York, in a paper read before the Photographic Section of the American Institute, in which he essays to describe the *rationale* of his particular form of emulsion, states his views upon this point in a manner which to many of our readers, as to ourselves, must, we do not doubt, appear heretical. Mr. W. Robinson, who had previously taken an interest in this question, takes exception to our supposing that Mr. Sutton's view had been proved and accepted, though he gives no reason for entertaining such an opinion. Mr. H. B. Berkeley, on the other hand, from a letter which he published last week, appears to accept Mr. Newton's idea; but, with all deference to the last-named gentleman, and though it may be a matter for discussion whether iodine or chlorine possesses the stronger affinity for silver or *vice versa*, there is, we think, no justifiable reason for upsetting the usual law by placing chlorine in the intermediate position. We will, therefore, review Mr. Berkeley's communication, and bring forward such reasons as we can in proof of the "orthodox" belief.

In the second paragraph the writer quotes the dictum of the late Mr. Sutton, which was supposed to account for the "idea" that chloride of silver was more sensitive than bromide; of this we shall have more to say later. Next, he refers to Mr. Newton's opinion that chlorine possesses a greater affinity than bromine, and cites in proof of it the action of the former on bromide of silver, "the chlorine ejecting the bromine from the bromide of silver and combining with the base." On the other hand, we will quote an experiment recorded by Mr. Sutton at page 265, vol. xxi.:—"Next, if we treat some well-washed chloride of silver—either recently prepared or not—with an aqueous solution of bromine, and then wash the salt, we shall find that the white chloride of silver has taken the pale yellow colour of bromide of silver, the bromine having displaced the chlorine from the chloride of silver."

Here we have two diametrically opposite statements, neither of which, however, we should consider, *per se*, a sufficient proof for either side, as there are several substances within the range of chemistry which are capable of mutually displacing one another from combinations according to the circumstances under which they happen to be present. Far more convincing, we think, are others of the reasons given by Mr. Sutton at page 265 and 301, vol. xxi, the most powerful of which is the relative action of alkaline development upon the three silver haloids. It appears perfectly impossible that bromine, if, as stated, it possess a less affinity for silver than chlorine, should in combination with that metal resist the action of an alkaline developer which is strong enough to decompose chloride of silver under exactly similar circumstances.

Then, again, the comparative lengths of time required to form a film respectively of iodide, bromide, and chloride of silver in a forty-grain bath were found by Mr. Sutton to be, respectively, *three minutes*, *half-an-hour*, and *twenty-four hours*. The same idea appears to be held by Mr. Robinson, who says, at page 494, vol. xxi., "a chloride film prepared in a similar way to iodide, as previously described, *though, of course, using a much stronger sensitising bath*," &c. The italics are our own. If it require a twenty-four hours' immersion in a forty-grain bath, or a shorter immersion in a bath of 120 grains, it does not appear that chlorine, despite its greater affinity for silver, is gifted with greater powers of *self-restraint* than bromine. We shall again have to refer to this part of the subject.

Mr. Berkeley then points out that Mr. Newton's theory accounts for the fact of the bromide of silver being more sensitive than the chloride. But has that gentleman satisfied himself that such is the case? From his letter we should judge not. He has found a gelatino-bromide emulsion to be more sensitive than one of gelatino-chloride; but is the question of sensitiveness real or only apparent? Our own view is that it depends more upon the difficulty in preventing the total reduction of the chloride rather than upon its want of impressibility; in other words, that, in order to keep off fog, such a large proportion of restraining matter has to be used that the effect of development is almost nullified. In the article above referred to Mr. Robinson states the same opinion from practical experiment, and Mr. Sutton also believed in the rapidity of the chloride if only the ease with which it is reduced were not so great.

The next paragraph deals with a statement which is in itself an anomaly. We allude to the reference made to the affinity of chlorine for silver and hydrogen, for both of which it is said to possess a greater attraction than bromine. We say that this statement is an anomaly, because development by means of alkaline pyro. depends mainly upon this affinity of hydrogen for the halogens which combine to form the acid, the latter again entering into combination with the alkali of the developer. This, then, is sufficient to account for the facility of reduction of the chloride; but how reconcile ourselves to the facts if we believe in the superior affinity of chlorine, which would act as a retarder of reduction? The relative affinity of the different halogens may be readily proved, experimentally, by placing in as many test tubes a few grains of freshly-precipitated and washed iodide, bromide, and chloride of silver. Half fill the tubes with water very slightly acidified with sulphuric acid, and into each drop a small particle of zinc or iron. As the hydrogen is evolved the contents of all the tubes darken from reduction to the metallic state, but at very different rates. The last mentioned will pass in the course of a few seconds to a deep and even black; the second will change more slowly; while the other, the iodide, will resist the action for a very considerable time, only changing in those portions which are in contact with, or in immediate proximity to, the zinc. If this experiment be repeated in the presence of a soluble haloid, so as to agree more closely with the conditions of ordinary development, the difference in the behaviour of the three halogens will be the more marked.

The next point we come to is the explanation offered of the *fact* that chloride of silver, in connection with bromide, conduces to greater clearness in the negative, although more easily reduced by

the alkaline developer. Mr. Berkeley's explanation is based upon the supposition of Mr. Newton, that "a chloride unites with the silver much more vigorously than a bromide," thus taking up with greater rapidity any free silver which may be present. We have just discussed the question of the respective affinities of bromine and chlorine for silver, and need only say, in addition, that in all our experiments with collodio-chloride the chloride has decidedly failed in impressing us with the idea of a vigorous union with the silver, as spoken of by Mr. Newton. On the contrary, the time which elapses before a good body is given to the emulsion has been very much longer than in the case of bromide.

But, we may ask, is it a *fact* that chloride conduces to greater clearness when used in emulsion? This has been disputed by many, and some of our first emulsion workers contend that the opposite is the result. Certainly Mr. Newton's idea of using a chloride instead of a bromide for the purpose of reclaiming an otherwise useless emulsion works well, and makes a foggy emulsion capable of giving negatives of the greatest clearness. In our experiments, made some months ago, when Mr. Newton first published his formulæ, we concluded that the same result, as regards clearness, could be attained quite as well by the employment of a bromide, *if used with discretion*, the only advantage of the chloride lying in the possibility of using a much larger quantity than would be compatible with success if a bromide were employed. This is due, as has been pointed out before, to the fact that chlorides exert a less injurious effect upon *sensitiveness* than bromides, while the *desideratum*—a soluble haloid in excess—is at the same time attained.

Mr. Berkeley has referred more than once to the different action of chloride of silver in emulsions of collodion and gelatine. This difference cannot, we think, be fairly brought into any argument referring simply to the sensitive medium itself, on account of the very great difference between the two vehicles mentioned. It is now a recognised fact that a gelatino-bromide emulsion far excels a collodio-bromide; why, then, should a gelatino-chloride be so much slower under similar circumstances? Our reply is merely that, in the case of gelatine, the restraining power which it exerts against chemical action is so great that the chloride requires a very much longer time to combine with the silver so as to form a sensitive film; that, in fact, after allowing probably a much longer time than would be necessary if bromide were the halogen used, there would still be a considerable proportion of soluble chloride in the emulsion. This would perform the double part of a restrainer of the development, while, at the same time, its effect upon the sensitiveness would be very much less than would be produced by a similar excess of bromide. In Mr. Robinson's article previously referred to he shows that chloride of silver in conjunction with collodion will give very sensitive films, but incapable of intensification with a strong alkaline developer.

To sum up, then, the facts of the case as they now stand: we can see no reason to alter the previously-formed opinions as to the comparative affinity and sensitiveness of the halogens when employed in conjunction with alkaline development. The use of chlorine in this connection has so far been confined to the addition of very small proportions to the other haloids in emulsion, and has never yet been studied by itself. The effect produced by such additions depends very much upon the manner in which the halogen is used —whether in the form of hydrochloric acid or of a chloride. If the former, the nitric acid liberated by the double decomposition acts as a restrainer, and gives clearness in the negative; if in the latter form, the proportion must be large, *and nearly the whole of the silver must be converted previous to its addition*, in order to produce any such result. We believe that it only depends upon the discovery of a suitable form of development to place the chloride in the first place as regards sensitiveness.

SLOWNESS OF LENSES.

The subject of the slowness of photographic lenses is forced upon us at present by a letter we have received from the Rev. Andrew M'Lean, of New York, who puts to us certain queries which he thinks would, if answered *in extenso*, add to the information not only of himself, but of numerous readers on both sides of the Atlantic, of whom he considers himself a typical representative.

The subject, however, on which we shall at present make a few observations is not—as might at first be imagined from the heading of this article—the slowness of action of some lenses as compared with others, but, rather, the deterioration of lenses as respects rapidity. To make the matter plainer we throw it into the form of a question, as follows:—Presuming a case in which lenses that were at one time very rapid have become slower in action, to what is this owing, and what is the remedy? In this query the whole problem is comprised, and to it we shall now endeavour to give an exhaustive answer.

When Mr. Thomas Gaffield, in 1872, read before the British Association a paper describing the effect of light upon certain kinds of glass, we suggested about that time that no cause of alarm need arise in the minds of photographers with regard to their lenses becoming slower owing to the action of light, although, as had been conclusively proved and demonstrated by Mr. Gaffield, a very great change took place in the colour of glass when exposed to a strong light for any lengthened period. As the glasses of the combination were so well protected from the light, by a dark camera at the one end and an opaque cap at the other, they were particularly shielded from all light except during the brief space when they were being used, and during which time they were scarcely exposed to a light of sufficient strength to cause a change. Since that period, however, we have become aware that, without doubt, not only do lenses undergo a change by the action of light, but a change of such a nature and to such an extent as to seemingly destroy their usefulness for the class of work designated "rapid."

The experiments of Mr. Gaffield, it may be remembered, went to show that when glass—more especially glass of the description most free from any tinge of colour—was exposed to light it gradually underwent a change, becoming, in some cases, of a brownish-yellow, in others of a greenish-yellow, and in others again of a purple hue. These changes were of so decided a character as to permit of pictures being printed upon, or in, the glass itself, by superposing an opaque plate of metal pierced with openings so as to form a design and exposing this for a few days or weeks to bright sunshine. The change of colour was understood to be occasioned by the manganese present in the glass, into which it is introduced to act as a decolouriser. The only objection to the admission of this theory was that discolouration was found to have taken place under the action of light in glass known to have been exempt from manganese.

In order to ascertain experimentally whether the glass used in the formation of photographic lenses was subject to this change, and, if so, to what extent, we took the front cemented lens of a half-plate portrait combination, and, without uncementing it, we sawed it through, dividing it into two equal parts. One of these we placed in an opaque cardboard box, which was placed on a window sill; the other half we laid upon the top of the box in such a manner as to ensure its exposure to light. The arrangement was such that both were exposed to the same kind of atmospheric influences, while one only was exposed to the light. After a protracted exposure both were removed, with a view to their being photometrically tested; but this was quite unnecessary, for the semidisc which had been exposed had become of a yellowish-pink colour of such decided force as to leave no doubt that it had ceased to possess any utility for rapid photography. This somewhat costly experiment entirely set at rest any doubts we might have entertained as to the immunity of photographic lenses from destructive luminous action.

It has already been placed on record how a portrait combination which had been used in the production of enlargements was found to have gradually become slower, and that when its place was supplied by a second lens, of which the former was "twin," a greatly-increased rapidity resulted. The former lens, on examination, was found to have become decidedly yellow in colour. The lesson to be drawn from this is obvious: avoid the exposure of

lenses to a strong light longer than is absolutely necessary. We believe that a feeble light does not act detrimentally. We have had one of a pair of similar lenses exposed to a north light inside of a private room since the 25th of October last, and upon comparing it with the other, which had not been exposed, we cannot perceive any change of colour upon both being laid down upon a sheet of white paper and examined side by side.

But it is necessary that we should now speak of the changes the cement of the front lens is apt to undergo. Canadian balsam is the agent by which the compotent parts of the front lens are placed in optical contact, and it is a little uncertain to what extent this gum undergoes change by the light. That it becomes slightly more yellow than it originally was is affirmed by those who have made the subject of gums their special study; but, so far as we have ascertained, the colour that results from such exposure is practically of non-effect when pure balsam is employed and the superfluous gum that oozes out round the edge has not been allowed, while in a wet condition, to come into contact with the brasswork of the cell. At a sale of lenses in a neighbouring auction room, some time ago, there was a large lens, by a maker of high reputation, the yellow colour of which provoked strong comments from the dealers and others present. The stain was so homogeneous and evenly spread that it seemed as if yellow glass had been used in the construction of the objective. We purchased the instrument for a small sum, and, feeling satisfied as to the quality of the glass usually employed by the maker, we had the lens removed from its cell, when we found it surrounded by a mass of greenish-coloured balsam. The action of the balsam on the brass had produced verdigris, which in time had penetrated the whole layer between the glasses. When this was removed and fresh balsam applied the lens became one of the finest we have ever seen, and which we much prize at the present moment. This kind of staining may be avoided by "baking" the lenses properly after being cemented.

BORACIC ACID IN THE BATH.

Although, judging from the rapid strides being made in the improvement of the various emulsion processes, the time is probably not far distant when the bath, with its attendant troubles, shall be altogether laid aside, we believe that until the arrival of that happy period any suggestion for its improvement is worthy of more than a passing notice. It is somewhat curious, notwithstanding the fact that probably more has been said and written on the bath than on anything else in connection with the practice of photography, its constitution and treatment remain practically the same as existed twenty years ago; for, notwithstanding that many suggestions have been made, and some of them—such as Mr. A. L. Henderson's recommendation to add nitrate of baryta—have met with more or less approval, it is still undoubtedly true that the great majority of photographers remain contented—influenced by the impression, we presume, that they cannot help themselves—to use a simple solution of silver with sufficient nitric or acetic acid to prevent the fogging of the image,

Now, despite the alleged success of Mr. J. W. Black, of America, and some of his followers both there and in this country, with very large proportions of nitric acid in their baths, the general impression amongst the most experienced workers is that the presence of that acid in undue quantity tends to the production of hard pictures, and that even in small quantities it renders necessary a considerably longer exposure than is required with a perfectly-neutral solution. In consequence of this many proposals have been made to work with the bath in an alkaline state; and it is well known that, where anything like instantaneous exposures are aimed at, one of the first conditions provided is a bath as nearly neutral as is practically possible.

Such being the case, photographers will hail with satisfaction the introduction of any substitute for the usual acids that, while possessing all their good qualities, shall be quite free from their objectionable features; and, therefore, we have much pleasure in calling attention to a recent proposal of M. Hermagis, of Paris, to substitute boracic acid. We know, however, that photographers have so often found such claims altogether unworthy of notice that even when a really valuable improvement is suggested it must be iterated and reiterated with some degree of perseverance before they can be induced to give it the desired attention. Therefore we have been induced to examine with some care the proposal of M. Hermagis, and to make a series of experiments with boracic acid, with the view of ascertaining whether its claim to a place amongst the stock of photographic chemicals should be recognised.

So far as we know, boron or any of its salts have not hitherto been utilised in photographic practice, although one of the latter—a borate of soda, but better known as "borax"—is largely used in the arts, especially in metallurgical operations, where, in consequence of its power to dissolve metallic oxides, it keeps the heated surfaces clean and enables the solder to adhere to the edges it is wished to join. Boron unites with oxygen in only one proportion (B_2O_3), and this anhydrous oxide readily combines with an atom of hydrogen and one of water, forming HBO_2, H_2O; or, to state it more clearly, one molecule of boron oxide unites with three of water, forming three molecules of boracic acid—$B_2O_3 + 3H_2O = 3(HBO_2\,H_2O)$.

Boracic acid is a natural production, obtained in large quantities in certain districts of Tuscany, where it issues with jets of steam produced by volcanic heat. The steam is condensed by being passed through water, and the acid is crystallised out after evaporation. As imported into this country it is very impure, being contaminated with sulphates of ammonia, lime, soda, iron, &c., &c., most of which are easily eliminated by solution and recrystallisation. Should, however, any difficulty occur in procuring the pure article it may be easily made by dissolving three ounces of borax in twelve ounces, or less, of boiling water, and adding to the hot solution one ounce, by weight, of sulphuric acid. As the liquid cools the boracic acid will crystallise out, and should then be washed to free it from sulphate of soda, and dried. Boracic acid is but feebly acid, and acts very slightly on litmus paper. Its hydrogen is capable of being replaced by various metals, and so giving rise to the formation of metallic salts of boron. It is sparingly soluble in water when cold, but much more so when hot—water at 60° F. dissolving only about four per cent. of it; but it is much more soluble in alcohol, the solution burning with a characteristic green flame.

In carrying out our experiments we dissolved ordinary commercial nitrate of silver to the extent of thirty-five grains to the ounce of distilled water, and on testing with litmus paper it was found to be slightly acid. A plate was sensitised, exposed, and developed, and found to be quite free from fog. The bath was then carefully neutralised with carbonate of soda and another plate tried, when unmistakable evidences of fog appeared. Boracic acid was then added in the proportion of one and a-half grain to each ounce. This addition did not in the slightest degree alter the effect of the bath on litmus paper, which did not, after the lapse of an hour, give the least indication of an acid reaction. Another plate was then tried and the result was perfectly satisfactory. We next took an old bath that had been laid aside for some time, and which on examination was found to contain over five drops of nitric acid per ounce. A portion of this was neutralised with moist silver oxide, and the boracic acid added as before, when it gave clean plates, full of detail and free from the hardness which had previously led to its being laid aside.

With a view to ascertain whether there was any difference in sensitiveness between plates sensitised in the bath containing boracic acid and in the half which contained the large quantity of nitric acid a plate was dipped in each and both exposed together. On development the difference was very marked. The negative from the untouched bath was very clean, with considerable density in the high lights, but wanting in detail in the shadows—in fact, they were simply clean glass; while that from the bath with the boracic acid was fully exposed, and appeared wanting in vigour when seen by reflected light, but looked like a fine printing, soft negative by transmitted light.

To sum up: although our experiments were somewhat hurriedly made, we have seen sufficient to satisfy us that the addition of boracic acid to the bath is worthy of more than the passing notice which is too frequently all that is given—at least, for a considerable period—to many valuable discoveries.

While making the last of the experiments we observed that silver oxide is readily dissolved by a solution of boracic acid, and the observation led us into another line of experiment, the results of which are so promising as to induce us to continue them; and we hope shortly to be in a position to offer some suggestions for the practical application of the substance so formed.

There are many points of interest in the paper read by Colonel Stuart Wortley at the last meeting of the London Photographic Society, which will be found in another column. What we wish now to refer to more particularly is the addition of sulphuric acid to the collodion emulsion for the purpose, as it is asserted, of conferring density when using rapid emulsions. So very many such additions have been, in turn, recommended, praised, and laid aside that emulsion workers must have, ere this, been forcibly reminded of the cry of "wolf" in the fable. The latest-published of these density-conferring methods are to be found in the formulæ of Mr. J. W. Gough and Colonel Wortley for the production of organic pyroxyline, of which we had occasion to speak last week. The latter gentleman claimed, some time ago, for this special formula that, for the first time, it "combined rapidity with density." Such being the case, the question arises—Why resort to any further means to produce the same result? We must suppose, however, that the manufacture of the gelatine pyroxyline entails some little extra trouble, inasmuch as, according to Colonel Wortley's formula, the cotton requires to be soaked in the gelatine solution and then dried; while the mere addition of a few drops of sulphuric acid gives, practically, no extra trouble. Then, again: the new pyroxyline is not yet an article of commerce, and until such be the case its use will be confined entirely to that class of experimentalists who delight in the preparation of their own materials, pyroxyline amongst the number. But, granted that an advantage accrues from the use of the sulphuric acid, can we trace that advantage to its real source? Colonel Wortley condemns both nitric and hydrochloric acids—the former on the ground that it entails feebleness of the image; the latter because it results in fog. Though, practically, we have never had to complain of such results, it would be easy to explain their occurrence in either case if it become necessary to go farther than the mere acidity of the emulsion.

PHOTOGRAPHIC NOTES.

I.—Solvents for Pyroxyline.

I was led to examine the action of different solvents upon pyroxyline in the hope of finding a satisfactory substitute for *ether*, believing the action of this latter substance to be most injurious on the system. I doubt if any person be able to bear its long-continued action without considerable injury, and on many the influence is very bad. In my own case I have sometimes felt the effects of coating a single plate.

How it is possible for operators to support the continued action of an atmosphere charged with ethereal vapour, such as prevails in many dark rooms, I cannot understand. Usually it is not the principal manager who is thus exposed, inasmuch as his functions are generally those of posing and arranging. The evil falls on the "operator," and, in my opinion, the mischief liable to be experienced is so serious that the occupation, as a means of earning a livelihood, seems to me most undesirable; at least, those who adopt it ought to be thoroughly and constantly warned of the danger to which they are exposed, that they may do their utmost, in the way of ventilation, to avoid it. Exercise, not carried to fatigue, in the fresh air should also be practised in order that the blood may be properly purified, as far as this may be possible; but fatigue should be avoided, because ether fumes act as a powerful sedative and depressant. The double action of many chemicals upon the system leads persons frequently to quite misconceive it.

Many agents, like ether, have this power of acting as a stimulant and a sedative. Opium is a conspicuous example. With ether the depressing is much more powerful than the stimulating effect. Many persons, with any dose short of what will produce anæsthesia, perceive no stimulant effect whatever, but after exposure to the fumes are conscious of a fatigue much beyond what can be reasonably attributed to the exertion they have made. In a word, ether is a poison, and if it were possible to get rid of it altogether from photography the advantage would be exceedingly great. So far, the choice seems to lie between collodion and albumen or gelatine, and the convenience of collodion is so much greater than that of the others that they have little chance. My object in these examinations has been to try whether it could be possible to use any other of the known solvents for pyroxyline as a substitute for ether.

Acetic ether has long been known to have the power of dissolving pyroxyline. It does so easily and abundantly. It has also been known that the solution dries opaque instead of clear. This would not be a fatal objection in itself; but having experimented with the solution, I find that it leaves the pyroxyline almost as a powder upon the glass. There is nothing that can be called a film; it can be wiped away with the finger, having no adhesion to the glass even when completely dry, whereas ordinary collodion leaves a film that bears some rubbing with the nail before it yields.

Acetone is less known as a solvent, but dissolves pyroxyline very easily. The coating left by it on glass closely resembles that just described and is liable to the same objections.

Methylic Alcohol.—The first observation that wood-spirit would dissolve pyroxyline was made some years ago by the Editors of this Journal, who described its action and took some negatives with a collodion made with it.

Having dissolved pyroxyline in some purified wood-spirit, I found it leave a film very much resembling those obtained with acetic ether and with acetone, though with a little more cohesion—enough, doubtless, to admit of obtaining an image upon it, but not such a film as one would care to work with. It then occurred to me to try the effect of adding ordinary alcohol. I found that the solution could be mixed with nearly its own bulk of ninety-five per cent. of alcohol (ethylic) without precipitating the pyroxyline, and that the film thus obtained was completely different—in fact, had a continuity and tenacity as great as the ordinary collodion film. The change was most remarkable; for the new film, instead of being opaque, was as clear as glass, and, instead of being weak and non-adherent, was tenacious and holding close to the glass. If the films obtained by the Editors had these properties I should be inclined to think that their wood-spirit contained ordinary alcohol, which I believe often happens. My own I am sure did not; it was some that I had purified some years ago whilst working with methyl-ammonia bases, by fractional distillation over caustic soda.

The next step was to prepare a washed emulsion by dissolving dried pellicle in a mixture of wood-spirit five parts, ninety-five per cent. alcohol three parts. This was set aside, and a month intervened before I had time to go on with it. At the end of that time a considerable, but not complete, deposition had taken place, which on shaking up the deposit readily re-emulsified, and the emulsion was then filtered and coated. A careful comparison was made between it and the ordinary emulsion. The wood-spirit emulsion gave a perfectly clean plate, but was, unfortunately, very deficient in sensibility. An exposure four or five times as long would have been needed to get an equal impression.

Unfortunately, therefore, the indications are unfavourable. The conclusions are not, perhaps, final, for there seems no reason why methylic alcohol should act as a retardent. There is an impurity in wood-spirit, to which it owes its peculiar smell, which is not got rid of by distillation with caustic soda, but which can be removed by treatment on a large scale, as it appears, by charcoal, as formerly managed in England by Mr. Eschwege. None of this was at my disposal, and it is possible (though very far from certain) that the diminished sensitiveness may have been due to this substance. I shall be glad if this present publication should tend to draw attention to the subject and to the importance of getting rid of this slow poison.

II.—Dr. Vogel's Colour Theory.

In several of Dr. Vogel's letters to the *Philadelphia Photographer* he has touched upon the differences of opinion between him and myself, and sometimes in a singularly discourteous way. In his last published letter he refers to a letter received by him from Captain Waterhouse, and quotes it at considerable length as completely confirming his own views. There results from this no little confusion, as will presently appear.

In The British Journal of Photography for September 17th last there was printed a communication from Captain Waterhouse referring to some experiments made by himself, and more especially to one showing that a plate coloured *red* with roseine was thus rendered sensitive to *red* rays, whereas without the roseine there was no sensitiveness to the red rays, the action stopping completely at the line D in the yellow. Captain Waterhouse mentioned this observation as being strongly confirmatory of the views of Dr. Vogel. So far, however, from its being a confirmation, it is a disproof. An increased sensitiveness to red rays produced by a body transmitting

red light is directly contrary to the theory of Dr. Vogel, who holds that silver bromide is rendered sensitive to rays which the colouring matters absorb. In considering, therefore, this result as a confirmation Captain Waterhouse appears to have taken Dr. Vogel's meaning as the reverse of what it really was (I may mention, in passing, that Mr. Stillman, in an article published last spring in *Nature*, fell into the same error).

Captain Waterhouse subsequently doubted the existence of direct relation between colours and sensitiveness, as appears by a communication in the Journal for October 1st. Dr. Vogel now claims that he no longer doubts, and quotes his recent communication to himself in proof of it. But from what I have said already it will be seen that Captain Waterhouse's confirmations are such as would apply to a theory the reverse of that maintained by Dr. Vogel. Thus Captain Waterhouse writes to Dr. Vogel that a *red* dye prepared by Judson increases the sensitiveness to *red rays*. *Coralline*, he finds, increases the sensitiveness to *red*. Blue colours, he says, are most sensitive to blue light.

Now, when we find Dr. Vogel cite these experiments at length, and then add:—"They confirm my researches to the fullest extent; where they *seem* to differ—that is, with coralline—this circumstance may be the fault: the coralline of commerce is of various quality, and various attempts gave me also very different results." When we find Dr. Vogel speaking thus we begin to doubt what the discussion really means. There is not a particle of doubt, however, that Dr. Vogel holds that the colours which act are those which are absorbed; it is for this reason that he refers to the action of coralline as contrary to his theory and exceptional. The misunderstanding between Captain Waterhouse and himself becomes evident when we find the action of that substance (coralline) cited by Captain Waterhouse in his letter as confirmatory, and by Dr. Vogel pushed aside as "abnormal." But, as already mentioned, Captain Waterhouse finds that a certain red dye of Judson's heightens the action of the red ray; for this Dr. Vogel is not prepared with any explanation. Again: there is a *blue* dye which heightens sensitiveness to the *blue* rays, as to which Dr. Vogel says that *his experience has been similar*. Here, then, are three conspicuous proofs against Dr. Vogel, one of which he ignores entirely, another admits, and the third, coralline, puts aside with the remark above cited, and then states that Captain Waterhouse's results confirm his own views "to the fullest extent!" The fact is that the interesting experiments of Captain Waterhouse amount to an almost complete disproval of Dr. Vogel's theory.

As respects coralline, its action is most important. That it does increase sensitiveness to the red ray there is no doubt. Some time before Capt. Waterhouse's first communication I had observed it, and it will be found mentioned in an article written by me, which appears at page 245 of the Journal for 1875. Neither have I experimented on one specimen of coralline only; on the contrary, I have met with none that did not heighten sensitiveness to the red ray. I consider the action of this one substance as being fatal to Dr. Vogel's theory, even were it unsupported by any other facts; but these will, on the contrary, be found very numerous, as, indeed, already appears.

My own view, to which I came nearly two years ago, remains unchanged—that many substances, both coloured and colourless, alter the sensitiveness of silver bromide (and of the other haloids of silver) to particular rays of light, but that no relation can be traced between the colour of the substance and the refrangibility of the ray to which it imparts sensitiveness. Nor do I doubt that, in the end, the truth of this view will be established. I was the first to observe that *colourless* substances also affected the sensitiveness of silver bromide to various rays, and cited this as in itself a strong argument against Dr. Vogel's theory. Afterwards, Dr. Vogel published this observation as having been made by himself. I called his attention to actual dates establishing priority, and it is, therefore, with grave surprise that I see him, in a paper since published in the *Transactions of the Chemical Society of Berlin*, repeat this claim without any notice of the priority which I had proved.

In the letter above quoted Dr. Vogel speaks of an intention on the part of Captain Waterhouse to continue his researches, and, when finished, to publish them. I trust the latter gentleman will carry out that intention; such a paper cannot fail to be interesting and valuable.

M. Carey Lea.

THE ACTION OF EOSIN ON THE PHOTOGRAPHIC SPECTRUM.

[A communication to the London Photographic Society.]

During the course of some experiments with reference to the action of various dyes in influencing the photographic action of the spectrum upon dry collodion plates prepared with bromide of silver, I noticed, in the *American Journal of Arts and Sciences* for May, 1875, an account of a new red dye, prepared by Caro, of Baden, and named, on account of the tint, "eosin" (from ἠὼς, the red of the morning, dawn). According to Hofmann it is the phthalein of dibromresorein or tetrabromofluorescin. It is soluble in water or alcohol, the solution being of a bright rosy orange colour, and showing a strong yellowish-green fluorescence, tending to green in the watery solution, and to yellow in the alcoholic. Examined with the spectroscope, a solution of it cuts off part of the green and blue rays from about ½D-E to ½F-G. It stains the skin, paper, &c., of a fine rose colour.

As I anticipated, from its chemical relations, that this dye would probably be particularly suitable for obtaining results of the same kind as those obtained by Dr. Vogel with other dyes, I procured some from Berlin, and am glad to find that my anticipations have not been altogether disappointed.

On adding a small quantity of the dye to bromised collodion I found that the fluorescence entirely disappeared, and the collodion took a bright golden-yellow tint, inclining to light orange, but without any trace of the rosiness peculiar to the dye. This effect is very similar to that produced by adding acid to a solution of the dye.

Dry plates prepared with this collodion and exposed to the spectrum showed, on development, a much greater sensibility to the green rays than to the blue, the maximum of action being in a band below E, extending to about halfway to D, and then decreasing till all action ceases just below D. Above E the action slowly decreases nearly to F, beyond which very faint action extends far into the ultra violet. The increased action in the region of the yellow and green is very strongly marked, particularly by its contrast with the very weak action throughout the blue and violet.

On another dry plate prepared with plain bromised collodion of the same kind, but stained by immersion in a watery solution of the dye, the same general characteristics are to be observed; but the image is stronger, and the band of maximum action somewhat more extended between E and D towards D, at which point the spectrum ends almost abruptly. This plate further shows a marked band of decreased action just above F, and extending about halfway between F and G. It is also noticeable that traces of action in the green and yellow were distinctly visible on the plate before development, though not in the blue and violet. This is the only case in which this effect has been noticed, though I have tried many different dyes giving increased sensibility in the less refrangible part of the spectrum.

Wet collodion plates prepared with the ordinary bromo-iodised collodion stained with eosin (which, unlike the bromised collodion, retains the fluorescence and rosy tint of the dye) exhibit a marked prolongation of the spectrum towards the less refrangible end, reaching a limit about D; but here the character of the spectrum is entirely changed from what it was on the dry bromide plates, and we have an image of fair density showing a band of maximum action extending from a little above H_2 to a little below G, where there is a sudden and distinctly-marked band of lessened action extending to about halfway between F and E, from which point the action then decreases to its minimum between *b* and E, and, again rising at E, gradually decreases till it disappears about D.

From this remarkable sensibility to the green and yellow rays it might have been anticipated that wet plates prepared with the eosin-stained collodion would show an increased sensitiveness for foliage and other coloured objects of a green or yellow tint. On trying a landscape I found that though the collodion was by no means strongly stained, the exposure was increased to about three times what was necessary for wet collodion. There was no marked increase of detail in the foliage, but, if anything, a decrease. There was, however, a great increase in the density of the image and in the clearness of the shadows. Subsequent trials, both with dry bromide and wet bromo-iodide plates, on bouquets of flowers and a stained-glass window comprising red, green, blue, and yellow, showed that but little practical advantage was to be gained by the use of the stained collodion, though the plates were undoubtedly more sensitive to yellow than is ordinarily the case, and showed the same increase of intensity, which may be a further advantage.

I have not yet had leisure to fully investigate the action of the dye; but this brief record of a few results obtained with it may be of interest, as bringing to notice a colouring matter which, in some degree, supports Dr. Vogel's theory that a film of dry bromide of silver may be rendered sensitive to certain rays of the spectrum by being stained with a colour which absorbs those rays—in this case the green; also as showing that the photographic action of the spectrum is but a slight index to the action of the coloured objects around us, and that we have yet to look for methods which will

enable us to overcome the difficulties of photographing the so-called non-actinic colours, though it is not impossible that success may ultimately be attained by somewhat similar means.

The accompanying four photographs may serve to give an idea of the relative degree of action of the spectrum on the stained plates as compared with an unstained wet collodion plate.

When leisure permits I hope to carry out further investigations on the photographic properties of this dye; and should other results be obtained, I shall not fail to communicate them.

J. Waterhouse, *Capt.*, B.S.C.,
Assistant Surveyor-General of India.

[Mr. Spiller stated that Captain Waterhouse had explained in a letter to him that he had been unable to send the diagrams mentioned. He had, however, sent some small photographs of the spectrum, which Mr. Spiller handed round.]

ON THINGS IN GENERAL.

What patterns of self-denial are the Editors of this Journal this month! Instead of administering impartial knocks to the various combatants eager for the fray on the Carey Lea-Wortley emulsion, they, who of all men I ever came across are the most deeply learned in the history of the art and of its minutest details, throw oil upon the troubled waters and begin the year with a clean sheet. No sooner is this matter out of hand than the Newton emulsion question turns up, and there can be little doubt of the correctness of the Editors' views upon intensification.

I thought the method of piling up hardness, such as the iodine and the redevelopment after fixing gives, was exploded years ago. I well recollect using it over twenty years since, when the production of sufficient intensity in a negative was considered a feat to be proud of. In those transition days we used to make our negatives generally by "converting" over-exposed positives; but, wet or dry, I never experienced with *any* process much trouble in the shape of fog *after* fixing. The American writer who on this question gives the "*rationale* of the theory" is the foggiest subject of all.

But, notwithstanding all this wrangling and jarring, the emulsion process is gaining converts almost daily, and already it has the real promise of a great future before it. In that respect it goes hand in hand with the autotype process, which has already attracted great numbers to its banners, and will continue to do so. On all hands the opinion is gaining ground that carbon will supersede silver for daily work of every description.

Taking the average of writers on emulsion the balance of favour seems to be accorded to the gelatine. There are so many testimonies to its rapidity that an unbiassed observer would be justified in believing it to be all that is said of it; but the cry of "wolf! wolf!" is so often uttered—*i.e.*, "wet collodion is doomed"—that one is sceptical of almost any improvement whatever till it is literally forced upon us. I see in the *Almanac* of a contemporary a method given for intensifying these gelatine plates. The writer must possess some rather elementary views on the principle governing intensification. Starting with an old suggestion of Swan's to dye the picture taken with pigmented tissue before finally drying it, this clever gentleman at once discovers that the same treatment may be applied to gelatine negatives by development. He quite loses the point. In the carbon process the difference in colouring—*i.e.*, between light and dark—is produced by the varying thickness of the film itself, while in the process with a silver salt the shades are produced by the varying depth of the *deposit*, the film remaining of a uniform thickness; any attempt to stain it will necessarily result in certain failure, and would ruin the negative by making it universally black. Without making any insinuation here, I cannot help saying that I am fully persuaded that some contributors write and advise upon subjects which they have never worked at all or sometimes even seen. And yet the suggestion is made with a calm assurance most delightful to read.

Just as coolly does "A Neapolitan Photographer" write a week or two ago, giving details of his practice. After stumbling, like most photographers, over his weights and measures, he gives a formula as follows:—"Ammonia, one drachm; shellac, one drachm; water, one ounce; dissolve." He might as well say pop a lump of sugar in your tea and stir it up. I know ammonia can be made to dissolve shellac, but it would be, with the quantities named, a very much more complicated operation than the formula suggests.

What complication there must be in M. Leon Vidal's process! Really it is quite exciting week by week to read of the thousands of pictures that are being turned out daily with perfect success and giving delight to all who see them, yet I cannot come across either a print or even any person who possesses one. Is it a plot to cause English photographers to visit the French capital? What can the cause be? I cannot rest till the whole mystery is solved and I see before me a print in its naked beauty. What an excellent process it would be for printing those pathological studies which are to be of such value in preventing disease! One has now only to get photographed every day, say before breakfast, and we shall be certain to know (if we get our picture the same day) whether we are going to be taken ill with the small-pox within the next few hours! What will be the next piece of rubbish I wonder that the "outer barbarians" will promulgate in the shooting season!

It is amusing to see the constant stumbles that are made over the perspective of photography. Scarcely a writer has the subject well in hand. There has been quite a droll passage of arms between two persons in other pages recently, in which both editor and correspondent seem to be unable to extricate themselves from the fog; and yet the whole matter lies in a nutshell. Using non-distorting lenses *every* picture that is taken is in correct perspective; but the effect will be misleading if judgment be not used in deciding how much of the picture should be cut away and in the standpoint to take it from. If a narrow-angle and a wide-angle lens, on the same spot, be used to take two views of any church, for instance, the perspective in each will be identical. There are, however, some people who will never learn.

And, again: there are some things that can never be learned. For example: it will take me a long time to learn to act upon Mr. George Hooper's advice, though I may share his æsthetic horror at the monstrosities of fashion. This is what he tells us all to do who are making our bread and cheese out of fashion and photography:—If anyone comes with a tight pair of stays, an ugly bonnet, objectionable headgear, high heels, or a "dog-collar round a pretty neck," say "We'll none of them," or, in his own words, "refuse to reproduce such extravagancies either as imperials, promenades, boudoirs, or full-length cabinets." "These pe prave 'orts;" but does he act up to them, or would any man in his senses do so. A little persuasion will often induce a lady to change a head-dress or remove any objectionable bow; but I think if I were to allude to her corset or even her high-heeled boots I should deservedly lose my connection, to say nothing of the probability of the chance of my remark tending to unpleasant discussions with brothers.

The brief and lucid account of Mr. Willis's platinum process from the pen of Professor Stebbing, in his last letter, is very interesting; it proves in a very satisfactory manner the rapidity with which prints can be produced by the process. I have seen no pictures sent out under the *name* "platinum prints;" but, if I mistake not, some very pretty studies which have a large sale throughout the country, and are published by a well-known firm, are produced by this new method. They are very beautifully printed on paper, utterly devoid of gloss, and have most of them a rich, velvety appearance, and a depth and transparency in the shadows such as plain paper silver prints never have. I wish I were as assured of their permanency as I am of their —— but, alas! though there is good promise of it, there are yet grave doubts. Prints produced as described by Professor Stebbing contain within themselves most of the elements of insecurity or, at any rate, uncertainty possessed by gold-toned silver prints, which, done by the most conscientious men, unfortunately give way far too frequently. There is the possibility of traces of hypo.; there are two, nay three, metals present with all their contingencies of galvanic action; and there is, finally, metal in a finely-divided state, which, of all others, is most conducive to chemical action, though, of course, it is well known that platinum is the most stable of all metals. I do not wish to be thought "a wet blanket;" but, as a practical man, I must look at these things in the light of everyday experience. Perhaps some of your contributors who are learned in chemistry will give us the benefit of their advice, for the prints possess high merit.

I am anxious to hear all about the Liebert medals; they are a very liberal offer from a private hand, and let us hope that they may come to this side of the channel. To revert to the topics of the earlier part of this letter, a claimant already exists—the gelatine pellicle process in Mr. Kennett's hands being, time after time and on good authority, stated to be doubly as quick as wet collodion. *Nous verrons.*

Free Lance.

ON SOME PHOTOGRAPHIC MATTERS.

[A communication to the London Photographic Society.]

The first subject to which I wish to draw your attention this evening is that of the use of nitrate of uranium in the silver bath. It will be remembered that, in reading a paper to this Society in June of last year, I mentioned incidentally that an increase of rapidity was obtained by the use of that salt. Some experimentalists in their practice, however, have found this not to be the case; but

the fault would appear to rest in some way with themselves, as I find that, in one of the almanacs just published, Mr. J. Barker states—"The addition of nitrate of uranium to the silver bath, as recommended by Colonel Stuart Wortley, was also tried, and with plain bromised collodion gave splendid results; also with ordinary bromo-iodised collodion it gave a considerable increase of sensitiveness, the only drawback being that it gave a pale blue film and a weak image which required a considerable amount of intensifying." I always use a collodion very strongly bromised—more so, I imagine, than most workers; and as that brings the conditions of my wet work nearer to those of dry work, it may account for the difference of results. I do not find any want of intensity in the resulting negative. But I also purify the nitrate of uranium and recrystallise it in the following manner:—The ordinary commercial nitrate is dissolved in ether, and I pour off the clear solution that remains at the top and recrystallise the salt therefrom. In these two bottles which I have brought with me is a nitrate of uranium dissolved in ether, and you will see a copious deposit at the bottom of the bottle. This deposit is partly the water of crystallisation, and partly matter insoluble in the ether; and the addition of the nitrate of uranium to the bath without the elimination of what you here see deposited is certain to produce a variety of evils. Herr Wöthly pointed out the necessity for this recrystallisation of the nitrate of uranium; and I also, when recommending the introduction of that salt to an emulsion, called attention to the necessity of this purification of the commercial salt, and pointed out the way in which it was to be done. I find, nevertheless, that Mr. Werge, who wrote stating that he had found a disadvantage in the use of uranium, added the ordinary commercial nitrate of uranium direct to his bath, omitting the necessary purification. I do not, then, wonder at his failure, and would point out that, if Herr Wöthly found the purification of the nitrate of uranium necessary in a printing process, it is clearly necessary in the much more delicate process of taking the negative. To purify the commercial nitrate it is only necessary to dissolve it in twice its weight of ether, and, after the insoluble part has completely settled from the solution, pour off the pure supernatant liquid and crystallise the pure salt therefrom. Those who take up this process and bestow ordinary care upon it will find that they gain—first, considerable increase of sensitiveness and almost entire immunity from pinholes or stains of any kind, a retention by the bath of its original good qualities until it becomes too weak for use, the power of retaining the plate in an evenly moist condition when out of the bath for an hour or an hour and a-half, and, finally, a singular power of photographing white objects without any tendency to halo or flare. In illustration of this latter point I pass round a transparency printed from one of my negatives, in which you will notice that the sun and the clouds immediately round it are as perfectly and evenly delineated as any other part of the negative.

The next point I wish to bring before you is the manufacture of pyroxyline from gelatine. I have published my formula in the *Photographic News Year Book;* but I have some time previously given it to other workers. Mr. Warnerke has taken it up with great energy, and writes to me that he is thoroughly convinced of its very great value. You are aware that Mr. J. R. Johnson, in 1873, published his process of spreading out a gelatine emulsion on a flat surface to get dry and afterwards cutting it up and washing it, and that Mr. W. B. Bolton has worked out this idea to a successful issue in connection with collodion. Gelatine pyroxyline is of particular value in this process where a tendency to thinness of negative is observed, and those who are experimenting in that direction will do well to adopt it. Among others, Mr. J. B. Gough wrote to me, some months since, that he had profited by my idea; but I find that he has published a formula recommending isinglass. I have made various experiments during the last two years with every sample of isinglass and gelatine that I have been able to obtain; and in nearly every case the former has given an unusually tender pyroxyline—so much so that it has frequently been impossible to give the negative the necessary amount of washing; and it has, besides, other disadvantages. For workers in this direction, therefore, I wish to point out that Nelson's opaque gelatine is the material to use; that the cotton before placing in the acids is to be soaked in a twenty-grain solution thereof, and then *very* thoroughly dried; and that the maximum temperature possible, short of solution of the cotton, is to be used for the acids. Mr. Warnerke has written to me such copious details of his work in this direction that I hope he may be prevailed upon to give his experience with gelatine pyroxyline at the Society's next meeting, as this pyroxyline in my practice is most valuable in bath dry-plate work, and is not without its value in the wet process.

I now wish to draw attention to a point in emulsion work which is quite new, and which I have adopted in my work. I refer to the use of sulphate of silver. This salt, while adding to the sensitiveness of an emulsion, enables us to obtain any amount of density in very rapid emulsion plates made with a large excess of nitrate of silver. You are probably aware that, in March, 1869, Mr. W. H. Wilson was the first to draw attention to the desirability of an excess of nitrate of silver in collodio-bromide; he was very definite on this point, calling attention to the way in which it increased the sensitiveness of the film. Some considerable time afterwards Mr. M. Carey Lea adopted Mr. Wilson's method of working, and increased considerably the amount of nitrate of silver; but at the end of the year 1870 he entirely gave up this method of working, and declared that nine grains in summer and ten in winter were the correct amounts of silver per ounce to be used in emulsion work. On the 6th January and the 10th February, 1871, leading articles appeared by the Editors of THE BRITISH JOURNAL OF PHOTOGRAPHY, conclusively showing that in using nine and ten grains of silver Mr. Lea was not using any excess at all. As Mr. Lea was impressing on workers in this direction that it was not only useless but injurious to use more silver than that in an emulsion, I thought it would be an advantage to my photographic brethren if I came forward and combated this mistaken idea of Mr. Lea's;* and in June, 1871, I read a paper before this Society, pointing out the necessity of saturating the collodion with nitrate of silver, and giving detailed formulæ of my method of working. At that time emulsion photography had been much facilitated by Mr. Lea's proposal to acidify the emulsion, without which important modification no really rapid emulsion work can be carried on, the only disadvantage being that nitric acid, which is far the best for the purpose, tends, with many samples of pyroxyline, to the production of a weak and thin image. Some workers use hydrochloric acid; but the chloride thereby formed in the emulsion renders the negative less sensitive and more liable to fog, while by the use of sulphuric acid in the emulsion, and the consequent formation of sulphate of silver therein, a very rapid, dense negative is with the greatest ease secured. From three to five minims of sulphuric acid should be added per ounce of collodion, varying according to the amount of bromide employed. It is quite easy to emulsify; and we gain the following advantages, viz., increased sensitiveness and great opacity of film, thus doing away in a very great measure with backing or even straining the film. To show you how quickly and densely sulphate of silver is formed I have brought a bottle containing collodion to which three minims of sulphuric acid per ounce has been added, and, on addition to it of a few minims of a saturated solution of nitrate of silver, you will notice how densely sulphate of silver forms. I strongly recommend this addition to the emulsion in preference to nitric, hydrochloric, or any other acid; and I am certain that all who once use it will never again use anything else.

One word now on the development of dry plates, whether made from an emulsion or a silver bath. I find, as well from my correspondence as from the journals, that my system of using a very strong alkaline developer is gaining ground rapidly; and I will, with your permission, say a few words on this subject, as the time for experimental work is now coming on, and it is one of great importance. I have, in a paper read before this Society a year and a-half ago, and in my various writings, constantly pointed out that extreme sensitiveness was secured by the use of a saturated solution of carbonate of ammonia. I have further done my best to impress upon those using strong development that the quality of the negative depended solely on the amount of pyrogallic acid used with the saturated solution of ammonia. Thus we arrive at the following two propositions:—1. Great sensitiveness is secured by developing with a saturated solution of carbonate of ammonia. 2. Any character of negative desired can be obtained by varying the proportion of pyrogallic acid used with the carbonate of ammonia; thus, while one minim of a forty-eight-grain solution per half-ounce of carbonate of ammonia solution will give an exceedingly delicate transparency, twenty minims of the same solution, with the same amount of ammonia, will give a very rich, dense negative. The following will be found to be a remarkably convenient formula for workers with any kind of dry plates, bath or emulsion:—Eighty grains of carbonate of ammonia dissolved by pounding in a mortar in one ounce of warm distilled water; 120 grains of bromide of potassium dissolved in one ounce of distilled water; forty-eight grains of pyrogallic acid in one ounce of alcohol. In all average dry-plate work one minim of the

* That Mr. M. Carey Lea has repeatedly, and even recently, shown the incorrectness of Colonel Wortley's historical *dicta* every reader of this Journal is aware. But all may not be equally aware that a period of four years has scarcely elapsed since Colonel Wortley, in a paper read before the Dry-Plate Club, wrote as follows:—"The discussions which have taken place since are so fresh in your memory that I will content myself with *reminding* you that Mr. M. Carey Lea *has strongly advocated the use of excess of nitrate of silver*" in emulsions. This conclusively settles the question.—EDS.

bromide solution to each drachm of the ammonia solution, and as many minims of the pyrogallic acid solution as shall give a negative of the class required, is a most excellent formula.

Emulsion workers will find it a most interesting experiment to expose half-a-dozen dry plates of any make, and, while keeping the ammonia and bromide at the standard strength indicated, vary the development of each plate by commencing with one minim of the pyrogallic acid solution, and doubling that amount on each successive plate. To show you the delicacy that can be obtained by this method of development, I send round two prints of somewhat difficult subjects.

I am afraid I have kept the members a somewhat long time; but I can only plead my desire to help others with what information I have myself worked out, and I will ask you only for a few minutes more while I show you some pieces of apparatus I have designed for the facilitation of carbon printing. I may mention that since M. Lambert's excellent method of working has been introduced to us I have entirely given up ordinary albumenised-paper printing; and from the courteous manner in which the Autotype Company will take any amount of trouble to produce special colours of tissues to suit individual desires, I hope never to revert to albumenised-paper printing. The pieces of apparatus are as follow:—

1. What I may call a "squeegee frame." I found some difficulty in holding a large glass, with tissue on it, and squeegeeing it comfortably; but by fixing it in here, as you see, it is done with the greatest ease and certainty.

2. A double pressure-frame, in which all the glasses with tissue on them can be placed one after the other, with a sheet of blotting-paper between each; and, as its two sides are made precisely alike, we reverse it, and, when the first tissue that went in is ready to come out, the frame is opened below and that tissue taken out. You will notice that these two blocks supply the pressure to the springs, being first used upright, then on their sides, and then taken away altogether. In this manner the whole of a photographer's day's work will pass through this frame with convenience and ease to himself. I use also two other useful "dodges"—one a board on which the dish of bichromate solution for sensitising is placed, and which has at one end two brass rods, over which (one for the front and one for the back) the wet tissue is drawn to get rid of the superfluous solution; and the other, a double rocking arrangement, by which the vertical bath, in which I develope several glasses at once, is put into very gentle motion during development, and which aids the gelatine to leave the plate.

With the assistance of these various dodges I find carbon printing easy and certain.

I may state that before bringing these two pieces of apparatus here tonight I had shown them to Mr. J. R. Sawyer and to M. Lambert; and as both seemed to think they would be of use to carbon printers I thought they might be of sufficient interest to bring before the Society.

H. STUART WORTLEY.

FOREIGN NOTES AND NEWS.

CHLORIDE OF SILVER AND SUBCHLORIDE OF SILVER.—THE POWER OF DISSOLVED CANE SUGAR TO RESIST THE ACTION OF LIGHT.—LOWERING OF THE TEMPERATURE WITH THE SOLUTION OF SULPHOCYANIDE OF AMMONIA IN WATER.—CONTROVERSY ON THE PROPOSAL TO FOUND A PHOTOGRAPHIC ACADEMY.

THE FREIHERR VON BIBRA, in a communication to the *Bericht der Deutschen Chemischen Gesellschaft*, says that he has tried a series of experiments upon various silver compounds, and he believes that subchloride of silver can be distinguished from chloride of silver blackened by exposure to the light. Taking citric protoxide of silver treated with muriatic acid to represent subchloride of silver, he concluded, from a series of fifteen coinciding experiments, that the formula is $Ag_4\ Cl_2$, answering to the percentage composition silver 80·22, chlorine 19·78. The details of the data for this conclusion, so interesting from its bearing upon the theory of photography, are promised, but have not yet been published.

A statement made by Raoult, to the effect that pure cane sugar, dissolved in water and completely protected from fermentation and air, undergoes a partial chemical change solely induced by the action of light, is combated by Dr. N. Kreusler in a paper read before the German Society of Chemists. Dr. Kreusler undertook a series of experiments similar to those described by Raoult, with absolutely negative results; but some tubes containing the solution experimented upon, in which he had purposely left air, showed decided traces of the formation of glucose. From this he infers that Raoult's result might have been occasioned either by an accidental reserve of air in one of his tubes, or else that a substance was mixed with the sugar observed by him which, in some way or other, affected the glucose contents.

Böttger's *Polytechnischen Notizblatt* says that if finely-powdered sulphocyanide of ammonia be dissolved in an equal weight of water of 15° C., the mercury of a thermometer dipped into the mixture falls to 10° C.

A controversy has been going on for a considerable time back in the German photographic journals as to the desirableness of founding an academy for the technical training of young photographers. The discussion was opened by a proposal that such an academy should be founded in Berlin, made by Dr. Vogel in an exhaustive article on the subject of the education of photographers, which appeared in the *Mittheilungen* about a year ago. In introducing the subject he said:—"When photography was newly invented it drew its recruits from every branch of human industry. Particularly at first it was painters and draughtsmen, with a greater turn for business than for art, who possessed themselves of it and quarried it like a gold mine. Later, every condition and every calling furnished its contingent of men and women, who cultivated the new art and made their fortunes so much the easier that, at first, the demands of the public were almost incredibly unexacting. In the first days of the invention, as such, men were so carried away by enthusiasm for the magical action of the sun's rays that they willingly paid a high price for a specimen of it, whether good or bad. Indeed, the art-knowledge of the public was of no very exalted kind. The number of real art connoisseurs is exceedingly small. Artistic judgment can only be acquired by the study of eminent works of art. And who has the opportunity of studying these in small towns? and how many avail themselves of the opportunities of large towns?

"Everyone possesses a certain amount of natural taste—some much, some little. This much or little is cultivated—formed—by education. In Germany it is very much cultivated in the musical direction, but very little or not at all in the direction of the graphic arts, for no one will maintain that drawing as at present taught in schools forms the judgment in art matters. The children learn to make strokes, to paint in sepia, they even carry it sometimes so far as to be able to copy a plaster cast of a head or a flower; but as to what constitutes a work of art they know nothing. Perhaps they may hear the names of Raphael, Michael Angelo, and all the greater masters; but *what constituted* them great masters remains a mystery to them, though nothing could be easier than for every school to get a collection of photographs from the most celebrated paintings, and from them the pupils might gather some idea as to what constitutes a great master.

"It is no secret that many photographic artists, speculating upon this artistic ignorance of the public, furnish without scruple pictures of whose artistic faults they are well aware, in the hope that people will not perceive them. Sometimes this succeeds, but not always."

But the public taste is improving; therefore, Dr. Vogel argues that any photographer who wishes to take a high place in his profession should know something of art, and not of art only but of chemistry, optics, anatomy, drawing, &c., and thinks it is high time to found a photographic academy. His opponents argue that anyone who is anxious can easily learn all that he requires of any of these branches at some of the art and science classes in the larger towns, and that, consequently, it would be a work of supererogation to found a special academy. Dr. Vogel retorts that if the academy were once founded pupils would soon flock to it, and instances the Frankfort School of Industry, which began with nine pupils and three years after had fifty on the roll. So the matter stands for the present, and Germany seems not much nearer having a photographic academy than she was before; but there may be a good time coming.

ON PHOTOGRAPHS TAKEN IN CONNECTION WITH THE ARCTIC EXPEDITION, 1875.

[A communication to the London Photographic Society.]

HAVING had the opportunity of taking a series of photographs in relation to the present Arctic Expedition (which photographs attracted some attention at our recent exhibition) I propose saying something about them this evening which, I hope, may be interesting, and will show them on the screen as the easiest way of referring to them as I go on. The portrait now shown is Captain Nares, who was called home from the *Challenger* to take this command.

In obtaining these photographs I had to encounter many difficulties; and if I point out some of them it is that beginners in that sort of work may see that they are likely to require a large stock of patience and perseverance.

First, having armed myself with introductions, we (that is myself and son) started with a considerable amount of luggage; for, not knowing what our opportunities might be, we packed everything required for the wet process for all sizes, from *carte de visite* to 16 × 12.

I may mention that for such work I use the bath about forty, rather acid, Mawson's collodion, and ordinary iron developer, thirty grains to the ounce.

Once in Portsmouth dockyard we obtained the use of a cellar in which there was a sink and water laid on; and this made a capital dark room.

Now, having the permission of the Admiral Superintendent (Sir Leopold McClintock) to photograph and all things prepared, we looked for our work.

Already other photographers were there, also looking for what to do. We were too soon, and were all equally perplexed. There were the ships to be sure, but they were refitting, loading, painting, all at the same time; there was hardly a square yard of surface, either inside or out, but some busy artificer was at work on it. Everybody was too busy to talk or to listen to me; and so nearly two days passed by before we could see our way to getting any pictures at all.

There were objects intended to play a practical part in the expedition, and of which I wanted to get a record; but they were in a rather dark room, and the articles I most wished to photograph were in front of the largest window, so that the lens would only be able to look at the shady side of them. Then, again, it was a public exhibition, and the "many-headed" walked round and round the room in a continuous stream all day long.

The only method was to make friends with the men in charge, two very old salts—one very short, the other very tall and thin—the latter of whom had been to the Arctic regions with McClintock three times, and would have gone with the present expedition but that he was too old. He was full of enthusiasm for his old commander, for his care of the men, and for his inventions, and also full of hope for the present explorers and their success.

A little persuasion induced these men to shift the objects I wanted early in the morning on to a bench by the side of an open door, and we took the negative before the public arrived.

It was a dull, drizzling morning, so a very long exposure was required. We had scarcely left the spot when another photographer's camera was planted where ours had been; but I fear the owner was too late, for the public were in the room long before he could have had time enough.

In this plate is the harpoon gun (with which they now shoot whales instead of throwing the harpoon by hand as formerly), ladders, picks, anchors, and the cooking utensils for sledge travelling, the fuel for which is spirit. In this photograph is a figure which was intended to show how the sailors would be dressed when out in the cold.

Towards the end of the public exhibition this figure was made useful by having a money-box attached to it soliciting subscriptions to the Sailors' Orphanage Fund; and I may mention that in three days the collection amounted to £40.

Close by these rooms were the ICE-SAWS—troublesome customers—in a very good place for the public to see, but with a bad background of boards and timber, which would have destroyed their form in a photograph.

It took a great deal of persuading and several persuaders to get them moved, for they were heavy and awkward to handle. The largest saw-blade is eighteen feet long, and, being lifted up by the pulley for each cut, cuts the ice by its own weight in descending. There is also a sledge, invented by Admiral Sir Leopold McClintock, weighing only seventy pounds, which is also a bridge capable of supporting as many men as can conveniently pass along it over any chasm they may meet with that is not more than twelve feet across, and also two pairs of snow-shoes bound together to form a small sledge.

H.M.S. *Discovery* was in so unfinished a state that it was scarcely worth trying a plate on it, and it was so placed in dock that I could find no vantage-ground from which to use one; but the *Alert* was more forward, a great difference having been made even in three days. By the kindness of the captain of one of the troop-ships (the *Euphrates* or the *Serapis* —I forget which) we got a berth on the forecastle of that vessel, and there, with the use of a triplet, obtained a picture just of the right size.

But we wanted the officers and crews, and that seemed to be impossible. At length I got to speak with Commander Markham, and induced him to give me an opportunity of taking the crew of the *Alert* in their working dress, as when loading the vessel. Accordingly, at one o'clock the camera and plate were ready, pointed at the side of the ship, and in focus for the spot marked out for the group. The men just then returned from their dinner, and were separating to their work, when Commander Markham hailed, and they all came up together. "Now," he said to me, "I can only give you a minute—one shot, you know." So I posed them, my son took off the cap for five seconds, and then off they went, not having been hindered from their work more than two minutes.

This pleased the Commander. He assured me, however, that it was hopeless to think of photographing the officers for some time to come, as they were too busy and never together; and, indeed, each one was only to be seen on duty, or going from place to place at a speed which showed they could think of nothing but their preparations.

The men serving were selected for their fitness out of a very large number of volunteers. They have double pay, and their time is to count as double time in the service.

Next came the tents and bedding to be used by the sleighing party which is intended to go on beyond the ships, and, if possible, to the north pole. These were placed in a large open shed with a very good light; but there was a foggy, drizzling rain, and the photograph shown is the best of three or four. The standing figure is that of the man who has been to the Arctic regions three times; and the one in the duffel bag is one of the present exploring crew. He also has been there before. The old salt told me that the tents represented are made to hold eight and ten men respectively. The men get into the duffel bags without removing any of their day clothes, except their boots, which they exchange for warm slippers. They pack in as close together as they can, head to foot, only fourteen inches being allowed for each on the mackintosh which is spread on the snow; and the last man closes the double entrance to the tent, so that only the small air-tubes near the top are left for ventilation. The last man in is also the cook for the following morning, and he has to come outside before he can strike a light. The air inside is said to be too foul for a light to burn in, while in the extreme cold it will support human life.

With these negatives it seemed we should have to be content, and we returned to London to turn them to what profitable account we might. But that seemed small; for everybody wanted portraits of the officers. "If you had got the officers, you know, then," &c., &c. So we resolved to go again and *get* the officers.

As the time for their departure drew nigh we prepared, and on May 27th were safely in the same dark room as before, and on the following morning began to work. The ships had been moved, and we secured the *Alert* at the jetty about eight o'clock, and the *Discovery* soon after; but while taking a second plate of that vessel thunder came, and then a downfall of rain that continued more or less heavily all day. No officers yet! and the expedition was to start at two o'clock on the morrow. With much trouble I succeeded in making appointments with Commander Markham and *some* of the officers of the *Alert* for a quarter to ten next morning, on their own vessel, that time being fixed because they would then all be there ready to receive the Lords of the Admiralty, who were to come on board at ten o'clock to make their final inspection. That was all I could arrange. But the day's troubles were not over; for we suddenly learnt that the premises in which we had our dark room would be closed on the morrow, because it would be a general dockyard holiday. We were also confidentially and confidently informed that it would be sure to rain all day—that it always did on dockyard holidays; and, from my experience of Portsmouth weather, I fully believed it.

We found another dark room; and next morning—which was cold and dull, more like March than May—we got to work early, to secure another view before the officers' group. This view took the bows of the *Alert* and of one of the large troop-ships, and also, in the distance, Nelson's old ships the *Camperdown* and the *Victory*. While preparing the plate for this, the man in charge of the premises came down to our dungeon, saying he had had an accident and broken a piece of glass; he hoped it was of no consequence. Alas! the focussing-screen was in many pieces! However, we managed to patch up three-fourths of it with strips of dextrined paper, and made it just usable.

Well, having taken the *Camperdown* and the *Victory*, I now boarded the *Discovery*, and, finding Captain Stephenson, succeeded in making an engagement for eleven o'clock. It was now time to be off to the *Alert*. There we found the decks clear; the sailors were below dressing for inspection, and Commander Markham the only officer to be seen. Gradually, by five minutes to ten, about half-a-dozen more made their appearance, when he said, "Now you must be content with us who are here." Then, just at the right moment, Captain Nares arrived, with some other officers; and, although he had not previously been asked, he very kindly fell in with the rest. In less time than it takes to tell we had exposed two plates; and thanking them and wishing them every success, we were off the vessel before the clock struck ten.

We were at the side of the *Discovery* with two plates before eleven o'clock, and in time to see the Lords of the Admiralty inspect the crew. After a speech from the First Lord, and a cheer from the men, off they came and on went we, and the gangway was closed against visitors. "Now," said Captain Stephenson, "make haste! make haste! crew and all." So the men were piped aft to make one group of officers and men together, but there was not room enough. So "The sailors first," said the Captain; but they had to stand and sit so close, and they were so jolly after the speech from the First Lord, that there was no doing anything with them with one plate; for as soon as the cap was off, one of them, the Joe Miller of the crew, said something which made them all shake with laughter, and quite spoilt the group.

The officers stood fire well; and I believe the group contains a portrait of every officer belonging to the ship. As we left the vessel a crowd of friends (chiefly ladies) passed on board to say "farewell." I must have appeared sadly in the way; for I had been keeping them waiting.

HENRY DIXON.

Our Editorial Table.

SONGS OF THE SOUL. By MUNGO PONTON, F.R.S.E.
Bristol: J. WRIGHT AND CO.

It is unusual in these pages to review any works of a theological character, particularly any work coming under the category of "sacred songs;" but we make a decided exception in the case of *Songs of the Soul*—not merely because they emanate from one to whom photographic science, art, and commerce owe so much as they do to Mr. Mungo Ponton (who was the first discoverer of the photographic properties of bichromate of potash), but because in these *Songs* the author has quite departed from the path usually pursued by authors in such rhythmical literature.

Mr. Ponton entitles his poems *Songs of the Soul: Philosophical, Moral, and Devotional;* and among the first of the three classes so enumerated we find several in which the most recent advances in science are recognised in a matter befitting the possessor of such a cultured mind as that of the veteran author. In astronomy, geology, spectrum analysis, magnetism, mineralogy, metallurgy, botany. and even in entomology, Mr. Ponton finds themes in which to indulge devout gratitude to the great First Cause.

In his ode on *Electricity* we are invited to—

Praise Him yet more for having taught
How, as a messenger of thought,
This energy may be employed,
And how it helps us to avoid
The hindrances of time and distance,
By overcoming their resistance.

In treating on the subject of *Light* Mr. Ponton sees a great deal to elicit thankfulness. Passing over much that is beautiful in this the fifth of the series of forty-eight philosophical and moral lyrics, we arrive at a few stanzas so intimately connected with photographic science that we make no apology for transcribing them:—

Thank Him that, in these latter days,
A secret long concealed—
What visible or latent rays
Can do—has been revealed;
How, by the tremors they excite,
Some molecules they disunite.

How images, in light and shade,
Of all that eye can see,
Are, by this chymistry portrayed,
Strange pictures which may be,
Though unperceived at first by sight,
Made subsequently clear and bright.

And how from those which, as regards
Their lights and shadows, show
Reversal, we may afterwards
Make other pictures so,
That, while the first we multiply,
These stand correct before the eye

Thank Him for having made it known—
What had been hidden long—
That every element, when thrown
Into vibration strong,
By heat or otherwise, displays
Each one its own peculiar rays.

While, in its more quiescent state,
It will absorb those same
Which, active, it can generate
In solar light or flame.
Thus what it genders or absorbs
Betrays it in far distant orbs.

We gladly embraced the opportunity afforded by the last meeting of the British Association of making the personal acquaintance of Mr. Ponton.

Correspondence.

CARBON PRINTING.

To the EDITORS.

GENTLEMEN,—Twelve months ago we were waited upon by M. Lambert, who asked that we should give him certain facilities in teaching and working in this country some improvements he had made in carbon printing. The specimens he placed before us were very good, and equalled, if not surpassed, the finest possible silver prints. To M. Lambert's request we replied that we would afford him what help we could, and that under certain conditions his pupils or licensees should be allowed to practice under our patents for double transfer without any hindrance or molestation from us. Since then M. Lambert has been very active and very successful in demonstrating his prossesses, and has induced many of the best photographers in the country to become licensees; moreover, the commercial value of the processes has now been settled without dispute.

Until recently the cost of a license from M. Lambert was comparatively small; the price has since been raised, and there was every appearance of a still higher charge being made. Convinced as we were at first of the genuine merit of M. Lambert's method, and that conviction much strengthened by his great success, we felt it to be our duty to step in and, if possible, prevent any action being taken which might tend to circumscribe the area of printing in permanent pigments by setting up anything approaching to exclusive rights. We have, therefore, purchased (subject to rights already granted) the whole of M. Lambert's interest in his patents, processes, and methods of working, for Great Britain and Ireland, Australia and India. We have also secured for a short time the valuable services of M. Lambert to demonstrate his processees under the most favourable conditions at our Autotype Works, Ealing Dene.

Whatever question there may be as to the validity of M. Lambert's patents for printing in carbon, there can be none (we think) as to the value of the original patents held by us, and to which M. Lambert's are clearly subject; in order, therefore, to put that gentleman's licensees in a secure position, we propose to issue to all who apply to us a formal license to work all the processes of double transfer under our original patents. By this step we give a substantial proof of our appreciation of the practical and commercial value of the improvements made by M. Lambert, and recognise in him a valued and able coadjutor.

Whilst the best method of producing good work, suitable for the profession generally, was not fairly settled, but remained in the experimental stage, we were content to allow the free use of our patents to all who chose to work in this new branch of photography upon very simple conditions. As we are now in a position to give full instruction, and to point out a method which, whilst being exceedingly profitable to those who adopt it, will raise the status of photographic work generally, we feel it due to ourselves to abolish the system of gratuitous instruction, and for the future to grant licenses under our patents for the right to make photographs in permanent pigments.

Considering that a sum of not less than from twenty-five to thirty thousand pounds has been spent in perfecting, so far, the system of autotype printing, we are quite of opinion that the time has come for a reasonable remuneration to accrue to those who have spent their money, their time, and their best energies in this enterprise.—We are, yours, &c., THE AUTOTYPE COMPANY.

Ealing Dene, W., January 19, 1876.

URANIUM IN THE SILVER BATH.

To the EDITORS.

GENTLEMEN,—I notice that you have honoured me with the expression of a hope that I would re-try my experiments on the above subject. I write, briefly, to state that it is not my intention to waste any more of my time and money on such a mania. As far as my experience goes there has not been any "new light" thrown on the subject. I have worked extensively with uranium emulsions, and in that state I employed the uranium dissolved in alcohol and *ether*, using the supernatant liquid only. In all forms and in all conditions I have found uranium to be less sensitive to light than silver; and I consider it contrary to common sense to expect to *increase the sensitiveness of the silver bath by adding uranium in any form.*

I have tried uranium in bromo-iodised collodion, and found that it decreased its sensitiveness when sensitised in a nitrate of silver bath; and the results of my experiments in that direction have been corroborated by one of the most painstaking and reliable experimentalists living—Mr. Russell Manners Gordon.

I was at the meeting when the paper was read and refrained from making any remarks on the subject, so little did I think of the "new light;" and I should not have written further on the subject had you not mentioned my name in your article in this day's issue of THE BRITISH JOURNAL OF PHOTOGRAPHY. Hoping that you will pardon me for trespassing on your space and time with such worthless matter,—I am, yours, &c., J. WERGE.

11*a*, *Berners-street, London, W.*
January 14, 1876.

[Since we received the above we have had a second note from Mr. Werge enclosing Mr. R. M. Gordon's letter, in order that we might extract what we thought proper from that communication. The following suffices:—"I quite agree with you as to nitrate of uranium in the bath. With dry plates it makes no difference, but wet ones are all the better without it." This experience of Mr. Gordon's is similar to our own when using some of the purified nitrate of uranium of the late United Association of Photography with the commercial collodion of the present period.—EDS.]

ORGANIC PYROXYLINE.

To the EDITORS.

GENTLEMEN,—I hold a letter from Mr. J. W. Gough, dated October, 1875, fully recognising his indebtedness to me in the matter of organic pyroxyline. It seems to me that after having during two years worked out an important modification of existing work, and having published it for the benefit of the photographic brotherhood, justice and courtesy should have restrained you from speaking sneeringly of the result as Colonel Stuart Wortley's "much-vaunted" organic pyroxyline.

It is of no use my entering into discussion of the question, because the editors of a paper have too much power for an outsider to contend against, in that they can (as you did in my case a fortnight ago) refuse to publish any letter at any time they think fit, and thus deprive their opponent of a fair hearing. Under these circumstances, therefore, I shall trust for the recognition of my work solely to the sense of justice and honourable feeling of your readers, and shall best consult

my own dignity and self-respect by confining my writings in future to processes and formulæ, and eschewing controversial matters, which cannot be of real interest to your readers.—I am, yours, &c.,

H. Stuart Wortley.

Rosslyn House, Grove End-road,
London, N.W., January 17, 1876.

[Photographers will be glad to learn of Colonel Wortley's intention of "consulting his own dignity and self-respect" by eschewing, for the future, all controversial matters. It was only in furtherance of such an intention—at that time apparently unformed—that we a fortnight since refused the publication of one of Colonel Wortley's letters, which, if published, would, in our estimation, have acted detrimentally on those proper feelings which he has now so judiciously determined upon consulting. We are sorry Colonel Wortley should charge us with injustice and want of courtesy in speaking, as he describes it, "sneeringly" of his formula. We had no intention of sneering at it, but applied an adjective which we then, as now, considered appropriate. A product the preparation of which is kept secret, while it is publicly mentioned as "pyroxyline made from an organic substance never hitherto associated with collodion," and which is offered as a panacea for all the difficulties hitherto surrounding rapid emulsion work—such a product can scarcely be otherwise described. But, now, with respect to the real gist of the matter—Mr. Gough's priority of publication: there are two points which are a little unfortunate about it. The first is that Colonel Wortley should have refrained from publishing his formula till he knew that Mr. Gough had left this country for India; the second that, after all, he has been forestalled by the latter gentleman, to whom, as being the first to publish, belongs, of course, such merit as attaches to the invention or discovery. But even if Mr. Gough had not been the first to publish, it was well known to us long since that Mr. Gough was in the habit of "organifying" his pyroxyline, of which he apparently made no secret nor did he attach paramount importance to it as a subject for which to make a "claim." We would not for a moment seek to insinuate that Colonel Wortley derived his "organic" inspiration from Mr. Gough, but we do know that with the latter gentleman it was a favourite idea long before we recollect Colonel Wortley writing about it; and it now stands on record that Mr. Gough was the first to publish. With regard to the working out and *publication*, "for the benefit of the photographic brotherhood," of this novelty, we must remind Colonel Wortley that, though asked more than once through our columns for his formula, he has studiously avoided giving it, merely vouchsafing the information that it was in the hands of several of his friends.—Eds.]

THE COMPARATIVE AFFINITY OF THE HALOGENS FOR SILVER.

To the Editors.

Gentlemen,—I note your observations in reply to my letter of the 8th inst. on the above subject, and have to thank you for the same; but, as I shall endeavour to show, the phenomena to which you allude are both capable of a different interpretation.

In the first place, with regard to the difference in the developability of the haloid salts of silver. What is the theory of alkaline development? As I understand it, the development is owing to the decomposition of water by the alkaline pyrogallol—the oxygen going to the pyrogallol, and the hydrogen seizing upon the halogen combined with the silver, selecting, by preference, those atoms which have been previously acted upon by light. Now you infer, I suppose, because iodide of silver is less readily acted upon by the alkaline developer than either bromide or chloride that, therefore, iodine must hold the silver in a more tenacious grasp than either bromine or chlorine. But may it not also be owing to the comparative indifference of iodine to hydrogen, as compared with either bromine or chlorine? This, at all events, is the view I take of the matter.

Secondly: you allude, in support of your theory, to the fact that bromide and, I may add, chloride of silver are converted into iodide of silver by treatment with a soluble iodide, and hence you conclude that iodine has a greater affinity for silver. But you overlook the fact, I think, that a fourth element is then brought into play. Thus, supposing we take some bromide or chloride of silver and pour on a solution of iodide of potassium, we then have bromine or chlorine, silver + iodine, potassium = iodine, silver + bromine or chlorine, potassium. Now, according to your theory, this result is owing to the superior affinity of iodine for silver; but my view is (and I think you must admit it is equally as tenable as yours) that it is owing to the superior affinity of the potassium for the bromine or chlorine.

In order to demonstrate the truth of your theory, instead of adding a soluble iodide to the bromide emulsion, as you propose, you should add some iodine pure and simple, and if, after doing so, you can find that an atom of bromine has been set free then I will acknowledge that your view may be correct. I am confident, however, that you will find nothing of the kind. On the other hand, I as confidently assert that if you treat iodide of silver with either bromine or chlorine the iodine will certainly be liberated. As chlorine, especially, is a nasty thing to deal with, you can try the experiment in the following way:—Make a mixture of—

Nitric acid	2 drachms,
Chloride of sodium	1 drachm,
Water	6 drachms,

and treat the iodide of silver with it. We then have the following reaction:—Iodine, silver + chlorine, sodium + nitric acid = chlorine, silver + nitrate, soda + iodine.—I am, yours, &c.,

Liverpool, January 15, 1876. Wm. Robinson.

[We must remind Mr. Robinson that mere statements of difference of opinion are of little value in argument. The two instances we last week brought forward in support of our view are based upon what has previously been accepted, and supported by actual experiment, as the correct theory. If Mr. Robinson desire to upset that theory he must be ready to come forward with valid *proof* of the correctness of his own; meanwhile, as he only speaks of what he *supposes* would be the result of the experiments he suggests, we should recommend him to try them. If the numerous experiments of the late Mr. Sutton be of any value we have little doubt that Mr. Robinson will be converted by his own argument. We refer our correspondent to an article on this subject in another column.—Eds.]

RE "THE PROGRESSIVE RESULTS OF THE PAST SESSION," BY JOHN NICOL, Ph.D.

Hear, Land o' Cakes and brither Scots,
Frae Maidenkirk to John o' Groats,
If there's a hole in a' your coats,
I rede ye tent it;
A chiel's amang you takin' notes,
An', faith, he'll prent it.—Burns.

To the Editors.

Gentlemen,—The shrill treble notes of the learned Mr. John Nicol, Doctor of Philosophy, swells into a deep diapason when he comes to sing of the shortcomings of us southerners. In the matter of albumenising plates, wherein I have given him amusement, I can only add—"Laugh and grow fat." Where we cannot extract wisdom let us try to get mirth, and such may be obtained by the spectacle of a learned doctor writing as though there were no force which bids "defiance to the law Newton thought he had discovered." Surely some of our Edinburgh friends can enlighten him about a certain species of attraction.

Until Mr. John Nicol, Ph.D., is kind enough to produce the testimony of some reliable authority that a disease Shakspeare terms "motley in the brain" is not present occasionally in his case it will be useless for me to endeavour to add the poor rays emanating from the tiny asteroid of my mentality to the glorious beams of intellectual might necessarily arising from so mighty an orb as a doctor of philosophy.

I can assure Dr. Nicol I have no objection to be held up to ridicule, provided a similar weapon be allowed me. As he has drawn this blade first it is but fair that I am allowed to cross the steel with him.—I am, yours, &c., W. E. Batho.

Halifax, January 15, 1876.

The Photographers' Benevolent Association.—The second annual general meeting for the benefit of the funds of this Association will be held at the Co-operative Institute, 55, Castle-street, Oxford-street, on Monday next, the 24th inst., at eight o'clock, when, after a concert in which several photographic friends and others will take part, there will be an exhibition of lantern slides by Mr. F. York. We hope there will be a good attendance, so as to give countenance and solid aid to this deserving Association.

South London Photographic Society.—A "popular" meeting of this Society was held at the House of the Society of Arts, on the 13th inst., when there was a large attendance. The entertainment consisted in the exhibition of a number of transparencies in the lantern by Mr. Hughes, of Hoxton, by Messrs. Frank Howard, Brooks, Wilkinson, and York. The collection of Mr. Howard embraced several "moonlight" and other pictures by Breese, as well as a number by himself; Mr. Wilkinson's contribution consisted of slides made many years ago by Mr. Huggins; Mr. Brooks's collection were "bagged" by him in Cornwall; while Mr. York showed a series of views taken in India, a description of each of which was given by the chairman, who had before him one of Mr. York's *Lantern Readings*, to which we have recently directed attention in these pages. It was a pleasant meeting, and, as we have said, was well attended.

EXCHANGE COLUMN.

ANSWERS TO CORRESPONDENTS.

☞ *Correspondents should never write on both sides of the paper.*

NOTICE.—As numerous correspondents are very well aware, we have at all times freely given such information as we could upon every matter on which our advice or opinion has been solicited, without knowing who were our correspondents. In future we shall require each correspondent to enclose his name and address, although not necessarily for publication. Communications may, when thought desirable, appear under a *nom de plume* as hitherto, or, by preference, under three letters of the alphabet. Such signatures as "Constant Reader," "Subscriber," &c., should be avoided. Correspondents not conforming to this rule will therefore understand the reason for the omission of their communications.

*** We are compelled to leave over several articles now in type till next week.

MOWBRAY HESLOP (Christchurch, New Zealand).—P. O. O. received. Thanks.

MAJOR ALLEN.—Thanks for enclosure. We shall communicate shortly with you.

W. H. SHERMAN (Milwaukie, Wis.).—Your letter, with enclosure, received. Thanks.

WM. RODGERS (Montrose).—Thanks for the two *cartes* of children. They are charming.

T. ROSS.—The manuscript has not yet come to hand, but when it does it shall receive immediate attention.

W. H.—We have examined the powder under the microscope, and believe it to be a pure specimen of chalk.

A PUZZLED PHOTO.—The whole secret lies in the fact of the clouds having been printed in from a second negative.

H. M'GEORGE.—We are much obliged by your communication, and shall take an early opportunity of trying the formula.

ALPENSTOCK.—The most portable tent in existence is undoubtedly that which was introduced by Mr. Howard, and is now known by his name.

LONDON PHOTOGRAPHIC SOCIETY.—From a note we have received from Mr. York we learn that he was not, as we imagined, the exhibitor of Mr. Dixon's Arctic Expedition views at the last meeting of the Society.

G. HEATHER.—The albumen process of M. Ferrier has never, to our knowledge, been published. The formula you have enclosed is certainly not the one employed by that eminent artist in the production of his transparencies.

G. P. M.—The picture may be literally true, and yet pictorially untrue. The obtaining of a view of a house, by means of a wide-angle lens—by which paltry foreground objects are so magnified as to receive undue prominence, the house itself being dwarfed by comparison—forms an example of what we mean.

H. W. D.—We can account for the spots on the negatives only on the supposition of their having been subjected, in some mysterious manner, to careless treatment. We have frequently seen negatives that were produced in a manner similar to yours, but never before saw any which had become stained during printing.

G. BARTON, SEN.—Your platinum rings can easily be converted into the bichloride of that metal by making a mixture of two parts of hydrochloric acid and one part of nitric acid and throwing them into it. Now apply heat and the dissolution of the rings will take place with great rapidity. Continue the application of the heat till the liquid becomes saturated.

JAMES KEVAN.—It is not necessary that the "retoucher" be fixed by the application of varnish, provided that the retouching has been effected by a blacklead pencil. In cases where special circumstances arise to render such fixing desirable it can be done by means of a very thin varnish. Of course, care must be taken, when applying it, that the primary coating of varnish be not disturbed.

F. J. W.—Upon consulting Storffer's *Dictionary of Solubilities* we find so many conflicting opinions given that we are at present unable to furnish a reply to your query. The salt being much more soluble in hot than in cold water the element of temperature must also be taken into consideration. The best way for you to proceed is to make a very strong solution of a definite strength and keep it in a stock bottle, adding water to reduce it to any required degree of strength. This system is adopted by numerous photographers.

R. T. J.—We have not yet had leisure to go thoroughly into the matter; but, in the meantime, we may inform you that we have, since receiving your letter, made trial of an interceptor having a curvature of nine inches radius for a lens of a similar focus to your shorter one, and find that it answers very well. There is no practical interference with the correction for colour.

W. C. B.—The only remark we have to make concerning the diagram is that it is quite incorrect. In the first place, the reflector is placed too high, to the extent of one-fourth of its diameter. Then, again: the back lenses are of such a form as to render it an impossibility that a ray of light should be correctly transmitted. Further: refractions of the rays are seen to take place where there is no lens to produce them.

E. S. B.—By registering the *photograph* of the decanter, you do not thereby register the design; and if by advertisement or otherwise you endeavour to convey the idea that the design of the vessel is registered, you incur the risk of being proceeded against for fraud. All that you obtain by the registration of the photograph is protection against any person copying that photograph. The registration of the *design* must be effected in quite a different way.

J. FORBES.—With respect to the comparative merits of the lenses mentioned we cannot offer any opinion, not having tried any of them. If the measurements of diameter and focus given by you be correct, No. 3 will prove to be the most rapid of those mentioned. It may, perhaps, from its being of larger diameter, be rather higher in price, but of this we are not aware. The kind of gelatine required (Cox's) may, probably, be obtained at any Italian warehouse; or, if not kept in stock, it would, doubtless, be obtained to your order.

D. X. L.—It is very difficult for us to give you advice respecting what prices should be charged. The prices obtained for taking photographs in London are not so much determined by the ability of the artist and the excellence of his work as by the social surroundings of his studio. We have often seen work of a very high class in *cartes* for which the photographer charged five shillings a dozen, while we have quite as often seen work of an indifferent order of merit for which four times that sum was readily obtained. Our advice is to allow no work to be issued from your studio that is not of the best kind you can possibly execute, and charge a good price. By doing so you will eventually make a position.

TORSO.—The faded print may not be quite restored by the treatment we are about to recommend, but it will be greatly improved. Having removed it from the frame place it in lukewarm water in order to have it stripped from off the mounting board, and then sponge it thoroughly to remove any traces of the mountant. Now transfer it to an aqueous solution of bichloride of mercury, taking care that it be all immersed. It will then be seen to undergo a change—the whites will become purer, and the faded, dingy shadows and blacks will assume a rich, deep brown colour, inclining to violet. This certainly was our experience when, a few years ago, we subjected several old sulphur-toned prints to the treatment described. The singular part of the affair is that all the pictures treated in that way are not only quite good, but are in much finer condition than a few alkaline gold-toned proofs printed since that time by a gentleman considered one of the best printers, and which have been kept in the same portfolio with the others.

RECEIVED.—Sir Thomas Parkyns; R. D.; W. E. Batho; F. W. Bannister; D. H. C.; "Aliquis;" L. V., and others.

THE LAMBERT PATENTS.—As will be seen by announcements in our advertising columns, M. Lambert has made over to the Autotype Company the whole of his remaining patent rights in the three processes of Lambertype, chromotype, and contretype. The Company will charge a small royalty for the use of the various processes in those districts which are not already covered by license, an arrangement which cannot fail to give satisfaction to those desirous of availing themselves of these admirable processes. It is also announced that a fourth patent will shortly be added to the three mentioned. Under the head of "Correspondence" will be found a letter from the Autotype Company, referring to the transfer of the patent rights of M. Lambert.

METEOROLOGICAL REPORT,

For two Weeks ending January 19, 1876.

Observations taken at 406, Strand, by J. H. STEWARD, Optician.

THESE OBSERVATIONS ARE TAKEN AT 8.30 A.M.

Jan.	Bar.	Wind.	Wet Bulb.	Dry Bulb.	Max. Tem.	Min. Tem.	Remarks
6	30·47	SE	—	31	35	28	Foggy
7	30·31	SE	33	34	36	29	Dull
8	30·06	E	—	29	33	27	Dull
10	30·32	E	—	32	37	31	Dull
11	30·21	NE	—	32	34	31	Snow
12	30·28	NW	—	27	—	25	Dull
13	30·27	E	—	32	36	25	Dull
14	30·48	NE	34	36	37	31	Cloudy
15	30·67	E	33	35	39	33	Dull
17	30·39	NW	38	39	48	30	Foggy
18	30·08	W	41	48	51	38	Dull
19	30·28	W	40	44	47	40	Dull

CONTENTS.

THE BRITISH JOURNAL OF PHOTOGRAPHY.

No. 821. Vol. XXIII.—JANUARY 28, 1876.

THE ORGANIC ELEMENT IN EMULSIONS.

Since the introduction of emulsions into general use the organic element in the sensitive film has steadily advanced in importance until at the present time it is recognised as, perhaps, the leading feature upon which success is dependent. This is, without doubt, the consequence of the numerous researches which have been made in the direction of the discovery of the true requirements of the photographer in connection with pyroxyline.

In the early days of the collodion process the solution of pyroxyline was looked upon as merely a neutral substance, the only function of which was to form the basis or support of the image. The varying results, however, produced by different samples of pyroxyline soon led to a change of opinion upon this subject; but not until Mr. Hardwich took the matter up was any considerable light thrown upon the real value of a suitable collodion. That gentleman's experiments—which must be familiar to the majority of our readers—made it clear that not only was the collodion a neutral substance, but that it exercised a most important influence upon the character of the results obtained, and at the time that emulsions were first introduced it was thoroughly understood that for dry-plate work it was necessary to employ a specially-prepared cotton, or, at least, one the preparation of which differed from the formulæ hitherto employed for wet collodion.

Upon the introduction of emulsions it was at first believed that any sample of pyroxyline suitable for general dry-plate work would be equally adapted to the requirements of the collodio-bromide process; but this also was soon discovered to be a fallacy. So great was the difference in the behaviour of different samples of apparently equally good pyroxyline that we may safely ascribe to this cause the total failures of very many of our best emulsion workers of to-day in their earlier essays with collodio-bromide. As the process, however, commenced to make progress the fact soon became recognised that a special product was necessary if the most successful results were to be obtained, and it was not very long before the actual requirements became pretty generally known.

Upon the introduction, again, of washed emulsions the different treatment which the preparation had to undergo was not long in bringing to light the necessity for still another special preparation; but, thanks to the experience previously gained, the labour in this case was comparatively light. The difference existing between various samples of pyroxyline assumes two phases—namely, upon the point of sensitiveness and the power of giving density. These two qualities, both of high importance, are by some believed to be distinct and produced by different means; while, on the other hand, others assert that they are in a sense synonymous. We are inclined to agree with the former, as it is a notable fact that the most rapid films, as a rule, are the most difficult to intensify. Certain it is, however, that the fact has long been recognised that by certain additions, organic and inorganic, to the emulsion greater density has been secured with more or less injury to the rapidity. It has also been understood that this density-giving property was confirmed by some combination of silver with organic matter; hence it is that the majority of such additions have been organic.

So long ago as 1868 Mr. M. Carey Lea recommended the addition to the emulsion of various substances—gallic acid and soap amongst the number; but these were rather intended to replace the preservative than to perform the part of "intensifier." The same remark applies to the use of tannin, as first proposed in 1864, immediately after the introduction of collodio-bromide. In 1868, also, M. de Constant made use of tolu resin with a view of increasing the rapidity of his emulsion; but, though it was stated at the time that he succeeded with exposures no longer than would be necessary for wet plates, little has been since heard of his modification.

The first occasion upon which a real claim was made that the density of the resulting image was improved by such an addition was, we believe, when Mr. Lea recommended the use of *aqua regia*, one of its advantages being that its action upon the collodion conduced to greater intensity. Since that time numerous substances have been suggested for the same purpose, which have attained a varying amount of success. First, we may mention the use of the lactic acid, as recommended by Mr. H. Cooper. This substance, which was added in small quantity in the syrupy state to the collodion before or at the time of sensitising, was supposed to result in the formation of lactate of silver in the emulsion in addition to the bromide. Colonel Stuart Wortley followed with a slight modification, consisting of malic acid; but which produced the finer results we are unable to say, not having tried them comparatively.

Many of the organic compounds of silver, though quite insoluble in water, are either soluble or easily emulsified in collodion; hence any beneficial action possessed by such substances is retained in the film, while all matters soluble in water are easily removed. A very simple experiment suffices to prove the great advantage conferred by the use of such adjuncts to the emulsion, or by the presence in the collodion itself of a due proportion of the organic element. After coating a plate with emulsion, and washing thoroughly with water, treat one half of it for a brief space of time with alcohol and again wash, pass it through a preservative solution, and dry in the ordinary manner. Upon exposure and development a wonderful difference will be discernible between the two halves; for, while the portion treated with alcohol may contain at least as much detail as the other, the latter in point of density will be found infinitely superior

Some writers have asserted that the presence of this organic element militates against sensitiveness, hence it has been recommended, in order to produce an extremely rapid collodion, to treat the pyroxyline with alcohol before dissolving it so as to remove the peculiar organic principle, which is soluble in alcohol and is generally supposed to consist of nitro-glucose. On the other hand, it has been put forward as a means of conferring density when using a defective sample of pyroxyline to *add* nitro-glucose for that purpose, and, in emulsion work at least, it is stated to produce the desired result without interfering in the slightest degree with the sensitiveness of the emulsion.

The two latest novelties in this direction are the so-called organic pyroxyline and the addition of sulphuric acid to the emulsion. The former, though it has been in use in some quarters for about two years, has only been described during the last few weeks, and we have not yet had an opportunity of testing it personally, though it is

very highly spoken of by several who have had it in use. The latest novelty, however—the addition of sulphuric acid for the purpose of forming, as it is alleged, sulphate of silver in the emulsion—involves what to us appears a subversion of the hitherto accepted notions of chemical affinity as far as silver and sulphuric acid are concerned. But, granting such a reaction as the one mentioned above to be real, the questions arise—In what way does the silver sulphate act in producing density? Is it really the salt itself which produces the result? Or is it the action of the acid upon the collodion which produces other products which combine with the silver and perform the functions ascribed to the sulphate? Mr. Hardwich has shown that the action of sulphuric acid upon the cotton during the manufacture of pyroxyline tends to the production of density; and possibly the reproduction in our pages of Mr. Hardwich's paper on this subject led to the trial of sulphuric acid in the emulsion. It is not beyond the bounds of possibility that the result obtained may be due to the formation, by decomposition of the collodion, of traces of nitrite of silver, which is known to be a density-conferring substance.

ON PAPER NEGATIVES.

We well remember the enthusiasm with which the appearance of some of the productions of the calotype process was hailed on their first introduction to art and science circles, and it is matter for regret that the process has been abandoned to such an extent that there are not probably ten in every hundred photographers at present employed who have ever given it a trial. And yet it possessed many qualities of the utmost value, and gave results, even with the limited knowledge of the theory of photography that then existed, which, we think, ought to have secured for it a more prolonged career, and would now, in the clearer light under which photographic operations are carried on, probably be restored to a measure of public favour if its advocacy were taken up by a few zealous experimentalists, and its capabilities and advantages fairly brought before the general body of amateurs.

The main objections to the calotype were the long exposures found necessary, the difficulty in securing a constant supply of suitable paper, and the granularity supposed to be inherent in the paper itself; while the more immediate cause of its having been so suddenly all but abandoned was, doubtless, the fascination of the beautifully-delicate image formed on the collodion film and the very short exposure required for its production.

So far as long exposures are concerned, we believe that little difficulty would now be found in preparing paper that should be quite as sensitive as the average run of dry plates in use at present. The necessary conditions for producing a good photographic paper are now so well understood that, were a demand to arise, we have no doubt our manufacturers would be able and willing to meet; it while the much-dreaded granularity may, as is evidenced by several negatives now before us, be so thoroughly eliminated or reduced as to be not only an unobjectionable feature, but a great advantage—at least for all sizes of pictures down to 5×4. Should this be so, we are convinced that the many advantages possessed by paper over glass would soon cause a return to paper negatives by the great majority of landscape photographers, if only the question were properly taken up and the process carefully worked out.

We are, of course, aware that much has already been done towards the introduction of paper as a substitute for glass, and we have more than once suggested directions in which experimentalists might find a solution of the problem; but these, in most cases, had for their object the production of a film for which the paper was simply intended as a support, and in most of the methods proposed or hinted at the manipulation was sufficiently complicated to deter many from giving them a trial, or, at least, from persevering till the difficulties were overcome.

Under this impression we have for some time been experimenting in the direction indicated, and, although we are not yet in a position to give precise working details, we have met with such success as to warrant the hope, or, rather, the expectation that the introduction of a simple, certain, and rapid paper process is merely a question of time.

In view of the approach of the early spring time, when photographers will once more take the field, we think it right to throw out these suggestive hints, in the hope that others will take up the matter, and lend a hand in bringing about the desired results. Meanwhile, we shall merely indicate the course in which we have been working, premising that there is really nothing new, and promising to return to the subject whenever we have anything useful to communicate.

Keeping in mind the generally-received opinion that gelatine seems to give an exalted degree of sensitiveness to silver bromide, and that that salt is more sensitive in combination with a trace of iodide, we sought for a paper sized with gelatine alone, but are under the impression that better results were obtained by dissolving out the size from thick *papier Saxe* with boiling water, re-sizing by immersion in a solution of pure gelatine, and afterwards rolling or ironing. The paper so prepared was then immersed in a solution of bromide of potassium, containing a trace of iodide of potassium, and dried. The conversion into silver iodide and bromide was effected by placing the paper in an extemporised tray of the useful form recommended by Mr. Warnerke, and the silver solution poured in and allowed to act for varying periods; after which it was poured off, and the sensitive surface washed by repeated changes of water in the same tray. Various organifiers were tried, including tannin, morphia, gum, and albumen, &c., &c.; but care will be required to prevent staining the body of the paper. On exposing the dried paper we found it tolerably sensitive; but for a time we got discouraged by perceiving a tendency to fog under the development. Ultimately this was overcome by first soaking the paper in a weak solution of bromide of potassium, so that recently no symptoms of fog have been encountered. The development is conducted in the tray with the ordinary alkaline pyrogallic acid; and, so far as we have seen, there is no difficulty in getting up the necessary intensity. The washed and dried negative seems to have the image in the body of the paper, and looks opaque and slightly granular; but this altogether disappears on waxing in the well-known way, and especially when the waxed sheet has been pretty strongly heated before a clear fire.

It will be seen that there is nothing new in the line indicated, but we are certain that the process is capable of being successfully worked. We hope our readers will turn their attention to it, and that paper negatives will soon take the position they deserve.

METROPOLITAN PHOTOGRAPHIC INDUSTRIES.

THE VICTORIA AND FOREST LODGE WORKS.

At a by no means pretentious doorway in Queen Victoria-street may be seen a few specimens of *carte* and other portraits, indicating that within the precincts a photographic portrait establishment will be found. It is only when the waiting-room has been reached it becomes apparent that external appearances have failed to convey a correct impression of the extent and character of the business, everything testifying that the latter is conducted on a very extensive scale. In the reception-room a large number of visitors bide their time till called in rotation. In adjoining rooms are painters, framers, packers, and bookkeepers, the whole appearance of the place indicating a business having huge ramifications. Such is the establishment of Messrs. A. and G. Taylor, Photographers to the Queen.

As many of our readers are aware, the production of enlargements is one of the principal features of the professional work carried on at Crown-buildings. From the latter establishment we proceeded to pay a visit to the Forest Lodge Works. At the moment of our arrival the number of enlargements which were being produced solely for Crown-buildings was at the rate of sixty per day. This, let it be understood, has nothing whatever to do with the Victoria Works, of which we shall speak afterwards. While we were present and watched the operation of producing the enlargements in this wholesale manner we made a few notes, which we transcribe for the benefit of our readers.

The enlarging apparatus consists of a deal camera pointing upwards, at an inclination of about forty or fifty degrees, towards the sky in a northerly direction. In a frame is placed the negative

to be enlarged, the lens of the camera being directed towards a frame sliding on a tramway, and upon which the sensitised plate is placed. The enlarged picture now being produced is a transparency, which, when developed, fixed, and toned, is, while still wet, pressed in contact with a sheet of white paper and reared up with its fellows to dry, after which the papers are stripped from the glass, carrying with them the transparency, which, in consequence of the previous sizing of the paper in a special manner, is now part and parcel of the latter, the adhesion being so perfect as altogether to preclude the possibility of any separation. Owing to the uniformity of the size of the enlargement, and the consequent routine nature of the work, the operators in this department have acquired a systematic perfection and certainty of working impossible to be gained by those who only do this class of work at occasional intervals. The reason for allowing the pictures to become dry before stripping them from the glass is to ensure their having a smooth, hard, glossy surface, that being the condition preferred by the painters; for we may here state that, with very few exceptions, the enlargements are all finished in oils before being sent out.

There are only fifteen hands now employed at Forest Lodge, these being engaged in silver printing and enlarging for the private business of A. and G. Taylor. In this department about fourteen hundred *cartes* and four hundred whole-plate prints are daily produced, which, in addition to the sixty enlargements spoken of, afford a fair idea of an average day's business. All the other work, including carbon enlargements, has been transferred to the Victoria Works, to which we shall now direct attention.

It was in consequence of the increase of business at Forest Lodge that Messrs. Taylor were induced to extend their premises. To this end they effected the purchase of Victoria Works—a quadrangular range of buildings in Stanstead-road, situated within half-a-mile of their other establishment; but by the time their arrangements had been completed for converting it into a factory for photographic purposes the department devoted to book illustration had rapidly assumed such large proportions as to necessitate a reconsideration of the original design of the firm.

When we visited this factory, about a fortnight ago, we found it a perfect hive of industry, over sixty *employês* being actively at work in the various branches of an extensive business. Standing like a sentinel in the yard, inside of the entrance gate, is an erection having the appearance of a martello tower, which, upon inquiry, we found was the large solar camera originally erected by Mr. John Collier, formerly of Inverness, a description of which was given in our Almanac for 1870, when it formed the subject of the chapter on *The Equatorial Camera* in the series of articles on "Enlarging," which formed so prominent a feature in that year's issue of our Almanac. So great is the intensity of the light obtained by this instrument that a carbon print of 30 × 20 inches in dimensions may be obtained, fully printed out, from a *carte* negative in half-an-hour. As it is only in summer that such a camera can be properly utilised, the other methods of enlarging now in vogue are employed. The description of enlargements so produced are carbon, plain silvered paper, and collodion, the last-named forming the chief feature in the enlargements produced at this establishment. There are altogether six enlarging cameras—two of them solar cameras, the other four being of the kind described as in use at Forest Lodge.

The "Albertype," "lichtdruck," "collotype," or by whatever other name this useful mechanical printing process is best known, is carried out with great energy. At the time of our visit there were ten Albion presses at work, the other plant there being of a very extensive, varied, and complete character. The proprietors, Messrs. Taylor Brothers, Fox and Co., believe that in the class of work now being done by this process they have opened up entirely new fields of pictorial labour. In addition to very large orders already in hand, they were at the time of our visit about taking the preliminary steps towards the execution of an order just received for a hundred thousand whole-plate prints.

What is designated their "mechanical" printing process is analogous to that introduced by Mr. Woodbury, known by the name of that gentleman. Between the Woodbury process proper, as we last saw it practised and as it has been described, and the process employed in the Victoria Works there are several features of difference upon which we need not here enter, as the subject would possess no interest for the general reader. In the "mechanical" printing room there are ten tables, each having six presses. From these sixty presses *carte*-size portraits may be produced at the rate of forty thousand a day, eight portraits being printed at each "pull." In an adjoining room we saw some girls engaged in the preparation of the paper to be used in this process, the preparation consisting in rendering the surface hard and non-absorbent, which is effected by its being immersed in a resinous solution. The mounting of these mechanical prints provides occupation for fifteen girls. The cutting and trimming of the prints was formerly effected by hand; but, being attended by so many drawbacks, and involving the expenditure of so much time, this method has recently been discontinued, and hand-cutting is now superseded by machinery, in consequence of which one girl is enabled to cut and trim prints at the rate of ten thousand a day. The process now being described is that by which the illustration for our Almanac—*Simplicity*—was printed, eight copies being produced at each pull of the press.

The enterprising firm of A. and G. Taylor has been only ten years in existence; hence, although its business ramifications have assumed such magnified proportions, the firm is still youthful and, as we have seen, full of energy. The attention of Mr. George Taylor, the chief partner, was first directed to the subject of photography by hearing Mr. A. J. Wilson ("Aliquis") deliver a lecture on that subject in the Mechanics' Institute at Aberdeen, the native town of both these gentlemen. While engaged, about six years since, in taking views in the neighbourhood of Balmoral Mr. George Taylor was so fortunate as to be honoured by Her Majesty and the Prince and Princess of Wales sitting for their portraits, and with such happy results artistically that he not only received orders to photograph the tenantry of Balmoral, and numerous scenes in the vicinity of the royal residence, but also acquired the honorary distinction of being appointed "Photographer to the Queen." The landscapes and views taken on the occasion referred to were 18 × 15 inches in dimensions, and of the portraits then obtained there were sold twenty thousand copies of that of the Princess of Wales alone. The royal patronage, and, added to this, that of the Countess of Fife—from whom numerous commissions were received—gave the young firm such an impetus as only few experience, and an unvarying course of success seems to have followed. From a series of negatives of the *Albert Memorial* which were secured before that sumptuous structure became soiled from the action of the atmosphere, no fewer than a hundred and twenty thousand prints have been obtained and sold, and a series of instantaneous views of London have met with a similar measure of success.

The number of framed and coloured enlargements sent out during the past year was fifteen thousand; and to supply the frames alone six workmen are constantly employed under the superintendence of one of the brothers Taylor, four of whom are, in one way or other, connected with this very extensive business.

It is well known to professional readers that, as a kind of "annex" to the photographic business of Messrs. A. and G. Taylor, there has long been a "photographic furniture" factory. This has now been removed from Curtain-road to Forest-hill, and is under the sole management of Mr. A. Taylor. In this department there are about seventy different patterns of posing chairs, one pattern alone having proved such a favourite with the professional public as to lead to the disposal, last year, of a hundred and fifty of that single "accessory."

In all, the combined firms of A. and G. Taylor and Taylor Brothers, Fox, and Co. employ at present upwards of a hundred and twenty persons; and, although large, this number is likely to be greatly increased during the ensuing season—a fact which indicates unmistakably the commercial acumen of the one mind which so skilfully guides this vast establishment.

Since we wrote upon the subject of the affinity of the halogens last week we have received two communications—one from Mr. William Robinson in reply to our remarks upon his last letter, the other from

Mr. G. W. Webster—both of which will be found elsewhere. Mr. Robinson appears to take a view of the question which we can scarcely understand, as he says that his idea is "by no means new." The regular order of the affinities of the halogens for the majority of metals has been pretty well understood for some time, and it has also been known, or at least believed, that with respect to silver that order is reversed. Mr. Robinson, however, combats this theory, and adduces one proof, which is in diametric opposition to the testimony of a previous writer upon the same subject. This, however, we have previously stated can be easily explained, and is so in the article by Mr. Webster in the present number. In the case of the silver haloids, it is a generally-accepted fact that any one of the halogens in the free state will displace, under certain circumstances, another in combination, while by slightly altering the conditions the original one may be made to resume its position. But as regards the point at issue, namely, the question as to whether iodine, bromine, or chlorine possesses the greatest affinity for silver, the comparative experiments mentioned by Mr. Webster must be taken as *nearly* proving the correctness of the views we uphold. Chloride of silver is changed into the iodide or bromide by treatment with an alkaline iodide or bromide; while, on the other hand, it requires the chlorine in the free, and therefore most active, state to produce a corresponding change in the iodide or bromide of silver. We shall require some more weighty argument in favour of the superior affinity of chlorine before we can accept it as proved.

INTENSIFICATION BY MEANS OF CHLORIDE OF COPPER.

Some months ago the Editors of The British Journal of Photography published a new method of intensifying negatives of any description, based upon the chlorising effect of cupric-chloride upon the metallic deposit forming the image, after fixation. The idea of so changing the image into a haloid salt is by no means new, as many methods have been long known by which the silver may be first converted into an iodide or a chloride, and then, by subsequent treatment with various solutions, intensified to almost any degree of opacity.

Unfortunately, however, most of such processes have their drawbacks—some resulting in hard, chalky effects; others, though giving beautiful results at first, undergoing a gradual change under the combined action of light and of the atmosphere. All of them are, in addition, subject to the charge, more or less, of being beyond the control of the operator. The principle involved in the chloride of copper method is, however, quite distinct from any hitherto in use, and possesses the advantage of being capable of use either for raising or lowering the density of the image; while, owing to the complete control which the operator has over the action of the solutions, any required density may be obtained without fear of overdoing it.

Speaking of the principle of the action of such intensifying processes, I may be allowed to explain the differences as I understand them. Take, for example, first, the old method of mercurial intensification. The image, after fixing and washing, is treated with a strong solution of corrosive sublimate, which first blackens and then gradually bleaches the image. What the exact chemical reaction which takes place under these circumstances may be I need not here attempt to explain; but the immediate result is to produce a beautifully-white and pearl-like image by reflection. The film, after thorough washing, is treated with one of a large number of suitable solutions, when the colour of the deposit is almost instantaneously changed to an extremely non-actinic shade, which varies, according to the solution employed, from a warm yellowish-brown to deep black.

Negatives of very great beauty and softness may be produced by this method; but, unfortunately, the tendency lies towards too great opacity, the more delicate gradations of the picture becoming obscured, and, owing to the rapidity with which the change of colour takes place, it is next to impossible to restrain or hold in check the intensifying action. But, even when a perfect result is obtained, the mercurial deposit is of so unstable a nature that the printing qualities of the negative become rapidly impaired, until at length it is quite useless. This method has been, however, highly spoken of for the purpose of obtaining very great density in subjects containing no half-tone, such as copies of engravings, maps, &c. The same remark applies also to the method published by Mr. M. Carey Lea, based upon the use of Schlippe's salt. This latter is not, I believe, subject to the charge of instability, but requires very great care in half-tone subjects, owing to the extremely non-actinic colour it gives to the negative.

Another form of intensification, and one which, under favourable circumstances, produces the most baneful results of any, is the method of redevelopment with pyro. and silver after treating the image with a solution containing iodine. To illustrate the ill effects which may be thus produced it is only necessary to consider that the film becomes converted over the whole surface into iodide of silver to a depth depending upon the length of time the solution is permitted to act. This film of sensitive iodide, which is formed equally in the half-tones and high lights, is exposed to light and redeveloped with pyro. and silver, the effect of which is to cause an uniform augmentation of strength over the whole plate, so that the negative, if properly modelled, though weak, before intensification, becomes spoilt during the operation. I can only liken the effect to that produced by stretching tissue-paper over the reverse side of a thin negative, as is frequently done, or by using a coloured varnish.

Having tried the chloride-of-copper method several months ago I was much pleased with it, and have since found it free from the objections which may be urged against all other plans. As I have said before, it is equally applicable to the intensification or weakening of negatives, and is even more perfectly under control than the simplest forms of primary development. Many there are who hold that redevelopment ruins the modelling and half-tones of a negative—an opinion which has some truth in connection with the "piling-up" methods of intensification; but with chloride of copper no such objection exists. On the contrary, an image which may have been spoilt by injudicious treatment during the first development is frequently saved by treatment with the copper solution and redevelopment.

The differences in the principles involved are—first, in the case of chloride of copper the *whole* of the metal forming the image is converted by the chlorine, while with other methods the surface only is acted upon; second, the non-actinic nature of the deposit depends in the one case upon its colour, which may be influenced to a great extent by the strength of the developer, in the other upon the "piling up" of a certain thickness of silver over the whole surface where a deposit, however thin, exists; third, the action of the developer upon the whitened image is so gradual that it may be examined from time to time and stopped immediately the desired effect has been obtained, while in the other methods dependent upon the colourisation of the deposit the probable effect is so uncertain until the final solution is applied that many negatives are spoilt by over-intensification.

My method of working consists in the employment of a moderately-strong solution of the chloride. I make a saturated solution and use it mixed with an equal bulk of water, the whole carefully filtered. I prefer to use this solution in a dish or dipping-bath, in order to secure uniformity of action, though it may easily be poured from a bottle or glass. One word upon the keeping qualities of the solution. It will be found, after using for a short time, that a copious precipitate falls down; hence, if the same solution be used repeatedly, it is necessary to filter frequently.

The full action of the chloride having taken place, which may be known by the film acquiring an uniform appearance back and front, the negative must be thoroughly washed. I prefer to perform this operation by first flooding the plate with ordinary water rendered very slightly acid by means of acetic acid. This prevents accidental surface discolouration arising from the combination of any possible alkali in the water with the unaltered cupric chloride retained upon the surface of the plate. That precaution having been taken the washing may be finished by a very thorough rinsing under a tap or from a jug, success depending in a great degree upon the thorough removal of the last traces of copper.

The next operation—the reconversion of the whitened image by means of the alkaline developer—forms the chief feature of the process. Very great latitude in the matter of strength and proportions of the ingredients will be found allowable; but, as a rule, I prefer a rather weak solution, and in cases where great density is required I increase the quantity of pyro. rather than the alkali. The first action of the developer, if not restrained with bromide, is to bring back almost instantaneously the original strength of the negative, after which it goes on gradually increasing in force under the continued action of the solution until the desired effect is produced. It is curious to observe that a second conversion of the image, by means of chloride of copper followed by redevelopment, results in a still greater accession of density. This cannot be explained by the introduction of any additional silver to the image, nor can it be supposed to depend upon any action of the alkaline pyro. upon the copper salt; nevertheless the fact remains.

It is scarcely necessary to go into particulars upon the subject of lowering the density of negatives, as each operator's judgment will

lead him to the best result. I prefer, myself, to use a well-restrained developer, in order to keep it under complete control. It must be borne in mind that bromide in the developer only lengthens the operation, but does not, as in the first application, destroy detail.

Finally: I have found this method very useful in removing the slight fog or veil which frequently appears upon alkaline-developed plates. I plunge the plate requiring such treatment into a weak solution of chloride of copper, allowing it to stay a longer or shorter time, according to the degree of fog. If the negative comprise any shadows which *should* be represented by bare glass, examine these from the back, and as soon as a change commences to appear stop the action by well washing, after which the plate is treated with hypo. in the usual way. The operation may be repeated until the desired effect is obtained. W. B. Bolton.

JOTTINGS FROM MY NOTE BOOK.

No. IV.—The Carbon Process.

On the 25th of June, 1869, the Editors of this Journal published details of some experiments, having for their object the production of the pigment in the gelatine subsequent to development, the method being based upon the change of colour brought about by a solution of bleaching powder on carbonate of manganese. The idea is one which has not yet borne fruit; still, rightly applied, it may bestow a rapidity of printing not yet dreamt of.

A few weeks after the same gentlemen called attention to the somewhat extraordinary circumstance that alumnised gelatine is soluble in a solution of common salt, and, further, under certain conditions, the insolubility brought about by chromium oxide likewise yields to this solvent. The use made of these facts has been but slight; the only one yet that has come under my observation is deduced from the large percentage of Na Cl given by a quantitative analysis of a commercial transfer paper. Other substances have a similar action, amongst which may be named the cyanides of the alkalies. But more of this anon, when I have finished these jottings.

In the order of date M. Despaquis follows the Editors by details of a method for preparing a transfer paper which does not require the use of hot water to bring it into a state fit for transferring purposes. This was produced by the use of milk in the gelatine. Next must be mentioned the process patented by the late Mr. Window. Mr. Faulkner has electrified the photographic world by showing how valuable an adjunct this process is to an artist. A brief statement of the chief points in the process will not be out of place. My readers will perceive it has much in common with the process of MM. Garnier and Salmon, published in 1858. Mr. Window used as a sensitive composition honey, two parts; glucose, four parts; albumen, three parts; dextrine, one and a-half part; and saturated solution of bichromate of ammonia, seven parts. This was applied to the surface upon which it was desired to produce the picture. Such surface was then exposed under a positive. Those portions upon which the light has acted lose the property of becoming tacky, the other parts are ready to receive and retain any powder worked thereon, much after the fashion which MM. Geymet and Alker recommend in their treatise on enamelling.

On January 22, 1870, Mr. J. R. Johnson patented certain improvements in the making of carbon tissue. The points claimed may be briefly stated as follows:—The use of soap in the pigmented gelatine (which he compounded thus:—Gelatine one pound, water four and a-half pounds, colouring matter—say lampblack—100 grains, soft soap one ounce); the use of an oily pigment along with the above; and, further, the substitution of the proteine compounds wholly or in part for the gelatine.

M. Gobert recommended the use of a soluble variety of gelatine produced by M. Grenet, of Rouen, for making tissue. M. Vidal prepared a transfer paper, the chief point of departure from the usual make being that it was not rendered insoluble until the transfer was about to be effected.

Mr. Firling, in September, 1870, published the following:—Tissue, after exposure, was rubbed with a solution of wax in turpentine and then dipped into collodion; when this was set the tissue was soaked in water to remove all the bichromate, and then brought into contact with a temporary support, such as tin, glass, &c., pressed, developed as usual, and finally transferred to gelatinised paper. The same gentleman published details of a method for making a flexible temporary support, such as could be used over and over again. They will be found on page 561 of The British Journal of Photography for 1870.

At the close of the same year Mr. J. A. Spencer improved on Mr. Firling's process by coating a glass with collodion and developing thereon, and gave such details as he asserted were necessary to success, further adding that it was merely a modification of M. Fargier's process.

M. Vidal, in 1872, made and described the method of making a flexible temporary support which could be repeatedly used. It was prepared by immersing albumenised paper in a solution of stearic acid in alcohol.

M. Marion, in 1873, brought before the notice of the profession two novel methods of carbon printing which he termed "Mariotype by contact and pressure." The two may thus be described:—A sheet of sensitised gelatine is exposed, soaked in a solution of bichromate, then placed on a press, inked with a solution of a bichromate and chrome alum; a piece of tissue is placed in contact therewith and subjected to pressure, then removed and exposed to the light. Thus one print was made to yield many. The second method was sensitising and exposing the *transfer* paper, placing the tissue in contact therewith, leaving for a time, and then developing. In this case a separate exposure is needed for each picture.

With my next communication I hope to finish my jottings by bringing them up to the close of 1874—a year pregnant with much of interest to carbon printers. W. E. Batho.

ON "CHEMICAL AFFINITY."

It may not be inopportune at a time when some aspects of the subject are giving rise to discussion to indicate the more modern lights which have been thrown upon the important question of "chemical affinity." If anyone take up an old work on chemistry he will soon come across a "table of affinities"—a list put together with great care, showing the ratio of selective affinity existing among the various elements. This ratio was considered to be constant and fixed under all circumstances, and by its aid the ultimate result of the admixture of any given substance would have been confidently predicted. *Mais nous avons changé tout cela*, and one would as soon nowadays think of looking for an account of the properties of phlogiston as for a table of affinities.

The truth is the question of affinity is one of circumstance, its order under certain conditions being liable to complete inversion under others; and, now, for anyone to predict from the mere presence of three or more elements or radicles the order in which they will combine would be, to say the least of it, very unwise. With regard to metals these older writers gave the following as the order in which the elements named combined:—Oxygen, fluorine, chlorine, bromine, iodine, selenium, phosphorus, hydrogen.

But, as I have just said, this order is a question of circumstance only; it holds good in certain cases, but is entirely departed from in others, the determining conditions as to preferential affinity of any one element being very varied. Among them may be named temperature, solubility, power of vaporisation, relative proportion of elements present, &c., &c., a change in any or all of which would entirely prevent the drawing of that hard and fast line which is either drawn or asked for by some recent correspondents in these pages.

A few examples of the change or even inversion arising from altered circumstances will not, I trust, be deemed uninteresting by my readers. If the vapour of water be passed over a surface of metallic iron at a red heat it is decomposed, its oxygen being taken up by the iron and its hydrogen set free. If a table of affinities were to be composed from these data oxygen would be placed as having a more powerful attraction for iron than hydrogen; but if we take this same oxide of iron, and, after making it red hot, pass hydrogen over it, water is re-formed and the iron liberated. Similarly, the metal potassium heated in dry carbonic acid gas (to use the most familiar form) decomposes the latter, absorbing its oxygen and setting free its carbon; but if this combination of potassium and oxygen called "potash" be heated with charcoal—that is, carbon—the latter combines with the oxygen of the potash and liberates the potassium in the form of metal again.

A law of general application is that a precipitate will be produced upon the mixing in solution of two soluble salts if by any re-arrangement of their elements an insoluble compound could be produced; hence the *nature of the solvent* is a very important factor in predicting results. Acetic acid dissolves carbonate of potash, producing acetate of potash and disengaging carbonic acid; but if this carbonic acid be passed into a solution of the product (acetate of potash) in spirits of wine carbonate of potash is reproduced and precipitated, while the acetic acid is re-formed and combines with the spirit. Again: strong caustic potash will decompose carbonate of lime, the products being carbonate of potash in solution and lime precipitated; yet a ten-per-cent. solution of carbonate of potash will be decomposed by being mixed with lime, caustic potash in solution and carbonate of lime precipitated being the products.

The relative proportion of the elements present is of very great importance in determining the precedence of affinities, and a law was formulated by Berthollet, which, from its great practical bearing, I do not hesitate to reproduce here. It is as follows:—"A body to which two different substances capable of acting on it chemically are presented in different proportions divides itself between them in the ratio of the products of their respective masses and the absolute strength of their affinities for the first body." It will be noticed that here the table-of-affinities idea is made use of, and, as a result, the law has been founed inexact; and late experiments made by Bunsen have established the following two great principles:—

1. When two or more bodies, B B′, are presented in excess to the body A, under circumstances favourable to their combination with it, the body A always absorbs of the bodies B B′ quantities which stand to one another in a simple atomic relation, so that for 1, 2, 3 atoms of one compound there are always formed 1, 2, 3 atoms of the other. If in this manner there be formed an atom of the compound A B′ in conjunction with an atom of A B, the mass of the body B may be increased relatively to that of B′ up to a certain limit without producing any alteration in the atomic proportion.

2. When a body A exerts a reducing action on a compound B C present in excess, so that A and B combine together, C is set free. Then, if C can in its turn exert a reducing action on the newly-formed compound A B, the final result of the action is that the reduced portion of B C is to the unreduced portion in a simple atomic proportion.

Bearing upon this phase of the question, Dr. Gladstone has made a very extended series of experiments, from which the following conclusion is drawn:—"All deductions respecting the arrangement of substances in solution drawn from such empirical rules as that the strongest acid combines with the strongest base must, therefore, be looked upon as doubtful." The decomposition of soluble by insoluble salts affords some very instructive examples of affinities from which hints may be given useful in emulsion work. Thus, when one molecule of sulphate of baryta is boiled with fifteen of carbonate of potash it is entirely decomposed; but only *one-ninth* of it is decomposed if there be only one molecule of the latter, though, of course, that one molecule contains mass enough to entirely decompose the one of baryta. Yet, again: carbonate of baryta is decomposed at ordinary temperatures by sulphate of potash—a reaction which is the exact converse of the one named before. These examples of strong acids being displaced by weak ones could be multiplied to a great extent, and a consideration of them should be very suggestive to us all, more especially the emulsion workers. Under some circumstances it is scarcely possible to say how to expect the decompositions to result. We all know what a strong acid sulphuric acid is; and yet such a feeble acid as the sand of the sea-shore can, at a great heat, push it out from its combination with soda—a reaction daily performed on a very large scale in the manufacture of common bottle glass. Solutions of the alkaline carbonates will decompose sulphate of lead. The powerful agent, chromic acid, is driven out of combination with baryta by neutral alkaline carbonates; so, also, is the acid in oxalate of calcium; but this last reaction does not occur at all if there be an alkaline oxalate in solution at the same time.

We have now cleared the ground for some consideration of the silver compounds. If at a glance the distribution of chlorous elements to their bases appear anomalous, much more will it when the silver salts are discussed, and more useless than in any case shall we find a "table of affinity."

Chloride of silver is changed into bromide of silver when digested with bromide of potassium; and bromide of silver is changed into iodide of silver by digestion with iodide of potassium (chloride of silver also is similarly changed). From these reactions it is readily argued that iodine has the strongest affinity for silver. But let us see.

Iodide of silver exposed to the action of bromine is changed into bromide of silver; bromide of silver (or iodide) exposed to the action of chlorine is changed to chloride of silver! The very opposite of the deductions just drawn are now warranted; and so far are these last reactions from being mere laboratory experiments that I may say they are commercially made use of for extracting the iodine and bromine from the crude liquors made from the original substances whence they are obtained. Then, again: iodide of silver is converted into chloride of silver by boiling with *aqua regia*, and bromide of silver suffers a similar change; and yet, again, chloride of silver placed in strong hydriodic acid is changed into iodide, and if strong hydrochloric acid be added the same result is produced.

In noting all these reactions I have purposely used the old nomenclature in order that my remarks might be more easily understood by those who have not given much attention to chemistry, and whose knowledge of it is mainly confined to the materials in daily use, known under the names by which they are supplied by the dealers.

In conclusion: I would say that if to the hasty reader this article appear too theoretical, I would say I believe that a careful perusal of it will prove it to have a strong and useful practical bearing. I hope before long to have something interesting to say relative to the connection between iodine and the sensitising bath.

G. Watmough Webster, F.C.S.

NOTES FROM THE NORTH.

Notwithstanding the general complaint of dullness in the photographic trade there are still some who have faith enough to cast their bread on the photographic waters in the hope of getting an ample return. We have in Edinburgh a good example of this in an establishment recently opened in one of the most centrally-situated parts of the city by Mr. Ayton, who has been a successful photographer in Londonderry for many years; and, if I may judge from the specimens of work which he has brought with him, I should say his success is not by any means undeserved.

The site on which Mr. Ayton's establishment is erected has been occupied by several professional photographers in succession for many years; but, as the old buildings were taken down and a new "flat" built, he had an opportunity of constructing it according to his own fancy. Mr. Ayton has certainly shown not only much good taste, but also a thorough knowledge of the requirements of a large business, and much consideration for the comfort of his *clientèle*. The studio has certainly one disadvantage in the fact that it can only be reached by climbing three flights of stairs; but where really high-class work is done those requiring it will probably not object to the ascent.

The reception room, which is at the top of the second flight of stairs, is elegantly furnished, and plentifully supplied with specimens of Mr. Ayton's productions in various styles and sizes, nearly the whole of the small pictures being highly glazed or enamelled by a process of his own. Probably the most attractive feature of the room is a number of very fine enlargements of such excellent quality, artistically, as to show that he is much more than a mere photographer, and so perfect in manipulation that they defy even an expert to say whether they are enlargements or direct pictures. Mr. Ayton informed me that he intends to confine himself solely to carbon printing; and, to enable him to do that to the best advantage, he has bought the exclusive right to use the various Lambert patents in Edinburgh and neighbourhood, but does not seem to have made up his mind as to whether he will keep the good things all to himself or grant licenses to others in the city.

I think Mr. Ayton deserves credit for being the first in Scotland to go in exclusively for carbon, and hope an appreciative public will reward him by giving him a fair share of patronage. I may add that, amongst several novelties that Mr. Ayton kindly showed me in his laboratory and studio, there was in operation one of the geysers so highly spoken of by Mr. Jabez Hughes, and I can fully endorse all the latter has said in its favour. It is a piece of apparatus which no well-appointed photographic laboratory should be without.

Questions as to the proper charges for photographic work are of such frequent occurrence that for the benefit of all concerned prices should, in every instance, be arranged before the commission is executed. We have recently had another illustration of the trouble to which the absence of such an arrangement so often gives rise, in the fact that Mr. Moffat had to apply to the Sheriff to enforce payment for a number of prints he had been employed to produce. It is well known that photography is pretty extensively employed in courts of law, or, rather, in connection with law cases; and where not only a verbatim copy of a paper, but an exact *facsimile*, is required its aid is invaluable. Well, sometime ago Mr. Moffat was engaged to make several such copies, and, so far as I can learn, did so to the satisfaction of all who were interested. He was paid for the work, the payment, I suppose, being sufficient to cover the cost of the production of the negatives (which were on twelve by ten plates), as well as the prices for printing the copies. Subsequently an order was given for a number of additional copies, and for these a charge of five shillings each was made. It is often, however, easier to ask than to receive, and in this instance Mr. Moffat found such to be the case, as payment was refused on the ground of excessive overcharge. Mr. Moffat ultimately appealed to the Sheriff, who, after hearing both sides of the question, remitted the matter to Mr. Ross, of the firm of Ross and Pringle, who found a ready settlement of the dispute in a reference to his own books, from which it was abundantly clear that his firm had been in the habit of charging more for similar work.

In the production of portraits by photography there is room for the exercise of much artistic taste and ability, and the public are not slow to recognise and largely employ the men who can best combine those high qualities with technical excellence in their work; they are likewise equally willing to pay such men at a much higher rate than can be commanded by those whose productions hardly rise above the merely mechanical. The copying of papers, however, is work of a lower order, and under ordinary circumstances, the operation being purely mechanical, will not, and ought not, to command such high prices. I think there can be little doubt that as the value of photography in this kind of work becomes better known it will be more and more largely employed, and that in time each court will have its photographer, with a regulation scale of fees for all the various sizes of work required. Till that time arrives it might be well, as it could easily be done, if some general understanding were come to as to what charges should be made; as, if agents knew exactly what any certain number of copies would cost, and especially if the prices were not higher than to be fairly remunerative, photography would take the place of the press in most cases where only a few copies are required.

In going my usual round amongst professional photographers I find that the letter of the Autotype Company in the Journal of last week has produced some little consternation. They say that the time has come for a reasonable remuneration to accrue to them, and that in future they will grant licenses under their patents for the right to make photographs in permanent pigments. Do they mean that they will discontinue to supply their tissue except to those who may become licensees?* If so, it will for a time cause considerable inconvenience, as few photographers will succeed in making their own tissue of as good quality as they have hitherto been able to purchase it, and it will be some time before any large manufacturer can acquire the requisite experience to enable him to produce an article so generally reliable as that which Messrs. Spencer, Sawyer, Bird and Co. have been in the habit of sending out. I am not, however, much concerned about the relation between the Company and the profession—the latter, I have no doubt, thinks it can take care of itself; but I cannot help putting in a word for the amateur. But for his aid neither carbon printing or any other photographic process would have made the progress they have done, and, therefore, I hope the Autotype Company will continue, as heretofore, to supply their productions to amateurs, and that the latter class may, without let or hindrance, print in permanent pigments to their hearts' content.

John Nicol, Ph.D.

THE FRENCH PRIZES FOR PHOTOGRAPHY.

The following are the conditions laid down by the Photographic Society of France for their prize of 500 francs, to which the Minister of Public Instruction has since added an equal sum—making a prize of forty pounds in all:—The Photographic Society of France, appreciating the innumerable services which may be rendered by photography in every branch of science, art, and industry, and believing that these services will prove to be more numerous in proportion as the preparations and manipulations are more simple and easy, and also that this result will be more readily attained by the use of dry plates, have decided—

That a prize of 500 francs shall be decreed to the author of the best process for obtaining negatives upon dry films. The requirements will be a preparation capable of preservation for as long a time as possible, and which, poured upon a glass plate or other less heavy and fragile support, will produce by simple drying, without washing, a film whose sensitiveness and perfection shall be equal to wet plates.

As the conditions may possibly not be completely fulfilled, the prize will be awarded in full or in part to the competitor or competitors who shall most nearly fulfil the conditions.

The competition will be international, the only persons ineligible to compete being those who may be appointed judges, the Presidents and Vice-Presidents of the French Photographic Society and of its Committee of Administration.

The Commission charged with the task of making the award will be nominated by the Society, at its sitting in November, or, at the latest, December, 1876. Any persons having entered into the competition, or wishing to do so, and who may be elected upon the Committee of Judges, shall have the power to withdraw in order to retain their right of competition.

The competition which will be then opened will close on the 1st January, 1877. All parcels must be sent in, imperatively, previous to that date, to the meeting place of the Society, 20, Rue Louis le Grand, à Paris.

The parcels must consist of at least six prepared surfaces, not larger than 24 × 18 centimetres (about $9\frac{1}{2} \times 7\frac{1}{8}$ inches), and of 250 c. c. (about ten fluid ounces) of the substance used in their preparation, together with full written instructions as to its preparation and use, the whole to be accompanied by the name and address of the candidate.

The boxes, packets, or explanatory memoirs will be opened in the presence of the candidates or their delegates, or fifteen days after the Secretary of the Commission shall give formal notice by letter.

The competitors may operate personally before the Commission subject to the special conditions which may be laid down for all; or, if unable to be present, will be required to abide by the result of the trials which the Commission shall make or cause to be made before them.

The Commission shall have the right to demand, if they deem it necessary, an additional supply of the preparations, or further instructions for their experiments. The candidates will in no case have a right to ask for a repetition of the trials.

The work of the Commission will not commence until two months after the closing of the competition, and their report will be given in, at the latest, in the month following the last trial.

The whole of the process to which the prize shall be awarded, together with complete instructions, will be published by the Commission simultaneously with their report, and will become public property.

It is understood that the above conditions are liable to alteration, subject to suggestions made by members of the Society.

M. Liebert has also addressed a letter to the President of the Society confirming his offer of a prize of five hundred francs for a process "much more rapid than those already known and suitable for use in the studio." After thanking M. Liebert for his generosity it was agreed, according to that gentleman's desire, to leave the details of this second competition to the decision of a committee of the Society, useful suggestions on the subject being requested.

FOREIGN NOTES AND NEWS.

December Meeting of the Vienna Photographic Society: Russian Method of Printing-in Clouds; "Magic Mirrors;" The Surface of Lichtdruck Prints.—Exhibition at Munich.—Photographic Society of Toulouse Prize Programme.—Klary's System of Lighting.—A New Oil Sensitive to Light.—The Voigtländer Prizes for 1875.

At the December meeting of the Vienna Photographic Society, the President (Dr. Hornig) called the attention of the members to the medal offered by the *Société Francaise de Photographie* for the best dry process, and to that offered by M. Liebert for a quicker wet process, to be competed for at the forthcoming photographic "May meeting" at Paris. The Voigtländer prize committee then presented their report, and Herr Schrank expressed a wish that the programme for these competitions should be translated and published in the French photographic journals. He also recommended a fusion of the prizes offered for a sensitive dry process and a more sensitive wet process with those to be awarded by the Parisian Society. On the motion of the President the first half of Herr Schrank's proposal was approved, but it was deemed inexpedient, for various reasons, to identify the Voigtländer prizes with the French ones.

Herr Fritz Luckhardt called attention to Vanderweyde's studio roof, showed some drawings illustrating the method, and expatiated upon the advantages which that method of construction offers by concentrating the light at one place in the studio. Herr Jaffé referred to an *atelier* of like construction, used by him for some years, in which a similar end was attained, and gave it as his opinion that, though a glass house so constructed was suitable enough for taking single portraits, it was unsuited for groups.

Herr Luckhardt then made several communications on behalf of Herr Charles Migurski, who had spent a few days in Vienna, but had unfortunately been obliged to continue his journey that same day. The first communication was respecting a self-feeding and emptying print-washer, kept in motion by clockwork, used by Herr Migurski. The second was about the method generally used by Russian landscape photographers for taking natural clouds, and by which good results are said to be much more easily attained than either by printing-in cloud effects separately obtained, or by painting them in when retouching the negative. Herr Migurski says that in Russia most landscape cameras are constructed upon the stereoscopic principle. A view is first taken with a short exposure, by means of which a sort of outline of the

* From an advertisement in the present number it will be seen that the Autotype Company are treating amateurs and professionals on very liberal terms.—Eds.

landscape and clouds is obtained; a second plate is then exposed the full time, in order to secure all the details of the landscape. The sky can then be easily printed from the first negative. Herr Migurski's last communication was to the effect, that the so-called "magic mirrors" upon gilded plate glass are produced by transferring a pigment picture on to the gilded wrong side of the glass, this picture being only visible by transmitted light, because the thin film of gold leaf allows a good deal of light to pass through it, while the film of the carbon picture transmits little or no light according to its depth.

Herr Luckhardt then spoke of Mr. Willis's platinum process, and remarked he was sure platinum prints would "take" in England, owing to their being of a grey-black tone, which reminded one of prints from copperplate. In England, he said, this grey tone is more affected than in Germany, where a warm, reddish-brown tone is preferred. He also remarked that, in England, from thirty to thirty-five drops of perchloric acid is used to retain the white colour of silvered paper for some time—a preparation which does away with the necessity for fuming with ammonia, and which does not prevent good and equal toning. He also believes that Mr. Debenham, who uses perchloric acid in this way, thinks it might also be used advantageously in the restoration of the silver bath.

Dr. Hornig remarked that a preparation was advertised at ten francs per litre—a quantity which was said to be sufficient to preserve 125 sheets of silvered paper. He had sent for a sample in October, but as it had not yet arrived he could give no opinion as to its merits.

Herr Martin then said he wished to present those gentlemen who took an interest in lichtdruck with an idea which seemed to be correct in theory and worth trying, though it might turn out incorrect when the test of practice was applied to it. The glazed surface of lichtdruck prints have often a very disagreeable and inartistic appearance. To obviate this impression, and yet to give a coat of varnish either to all the inked parts or only to some, Herr Martin proposed that two lichtdruck plates should be made, from one of which the picture should be printed with the ordinary lithographic ink, while the other might be used for applying a colourless varnish. The necessary coincidence of the plates might be secured by means of punctured holes, as in the chromolithographic process. He also hoped that Herr Löwy would try an experiment with the plan during the Christmas holidays.

Dr. Hornig thought that some such plan must be adopted in order to overcome the drawbacks of unvarnished lichtdrucks on the one hand and the disagreeable gloss on the other, produced by the lac now generally used for varnishing lichtdrucks.

Herr Jaffé remarked that he had constructed a fumigating apparatus which he would place in his waiting saloon, if he knew of any fumigator that would overpower the strong fumes of ether and other chemicals.

Herr Luckhardt said he thought aromatic vinegar would answer the purpose. He had used it lately when annoyed by the smoke of some bad coal in the waiting-room stove.

The President then laid upon the table a pamphlet upon the carbon process, issued by the firm of A. Moll, and the proceedings terminated; after which the microscopic objects enlarged as transparencies, which obtained the Voigtlander silver medal, were projected by Herr Fuchs.

There is to be an Art and Industrial Exhibition at Munich shortly, at which photography is to be represented.

The *Société Photographique de Toulouse* offers prizes, consisting of two series of medals, for the best travelling apparatus for the dry-plate process. The size recommended is half-plate; but competitors are not restricted to that size. For the competition this apparatus will be considered in two divisions, viz., a camera with stand, and a lens. The camera must be as light as possible and pack into as small a compass as possible without interfering with its solidity, and should be accompanied by a store of contrivances to facilitate the repairing of it should it be broken on the journey. The objective should be a combination lens capable of being adjusted to various foci. The fastening of the various lenses must be simple, and easily taken to pieces and arranged with the mounting again. All apparatus intended for the competition must be sent, carriage free, to M. Ch. Fabre, 8, Rue des Renforts, Toulouse, before the 20th March, 1876.

We are promised shortly, in the *Photographische Correspondenz*, an account of an intensifying process with lead compounds, by Herren J. M. Eder and V. Toth.

M. Klary, a photographer in Algiers, has published a pamphlet entitled *Application to Portraiture of a System of Lighting, aided by a Coloured, Movable Head-Screen.* The screen is a sort of sail made of coloured cloth and mounted upon a stand, so that it can be moved in any direction. In France M. Klary sells his book and the right of using his system of lighting for one hundred francs.

In the journal called *La Science pour Tous* there is an account of a drying oil obtained from the seeds of the "Elaeococco vernica," of the family of the Euphorbiacea—a tree which flourishes in China and Japan. At 200° this oil suddenly stiffens to a transparent jelly, which does not stick to the fingers, and that can easily be divided into angular pieces which do not adhere together again. The oil also stiffens when exposed to the action of the light, and may yet have a part to play in some photographic process.

The committee of the Vienna Photographic Society, appointed for the purpose, have awarded the Voigtlander prizes for last year as follows:—1. The silver medal to Herr Julius von Kolkow, Photographer to the King of the Netherlands, for a collection of transparencies of microscopic objects. 2. A bronze medal to Herr Franz Knebel, for a collection of studies from nature. 3. A bronze medal to Herr Carl Wrabetz, for a collection of studies from nature. Each of these collections had a motto attached to the envelope, which was opened after the judges had made their awards in order to ascertain the names of the successful competitors. A silver medal was also awarded to Professor J. Husnik for his meritorious productions in the department of heliography. This year the Society proposes greatly to extend the prize programme, and to admit non-members as competitors for some of the medals.

PHOTOGRAPHY IN COURT.

MARIAN HEATH *v.* GEORGE GLANVILLE.

This was an an action brought at the Tunbridge County Court, on the 6th inst., to recover £5 for a month's wages, as assistant in the defendant's photographic business, in lieu of notice.

The case was supported by Mr. Stone, and defended by Mr. Burton.

Plaintiff, a young lady, said that up to September last, and two years previously, she had been in the employ of the defendant. On the former occasion she left at her own request. Expecting an engagement in Brighton, she consented to go to Mr. Glanville's for two or three weeks. Hearing that the gentleman at Brighton had died, she, after being in the defendant's employ three weeks, entered into an agreement with him, and it was agreed that a month's notice should be given on either side. She asked for a written agreement, but defendant said that was not necessary, as their word was sufficient. She got 25s. a week. In December he discharged her without any previous notice, and as he refused to give her the month's wages she told him she would summon him. Miss Wheeler was present, and heard what took place.

By Mr. Burton: Miss Wheeler was not present when the arrangement was made about a month's notice. When she asked defendant for the month's wages he said he had got her there, as there was no written agreement. She admitted that she had left on two previous occasions without notice, and that defendant had given her a month's notice. After the first week she did ask whether she was wanted for the following week, but not afterwards. Was paid weekly. Defendant called at her house first, and asked her to assist him in his work. He had called her attention to some photographs, and asked her to send them, but the assistant, whose duty it was to post the letters, forgot them. Defendant had received complaints about some photographs, but it was not her fault.

Miss Wheeler, defendant's assistant, said she was present when defendant discharged plaintiff. Plaintiff asked for a month's salary, and defendant said he had made no agreement, because he could place no dependence upon her, she having left on two previous occasions in a fit of passion. Defendant did also say, "I have got you there; you have no written agreement." In answer to Mr. Stone, she said both were very passionate.

Defendant said the plaintiff was in his service about two years, and left without notice, at a moment's warning, on two occasions. He wrote to her asking her to pay for some goods, and afterwards she came to the shop. She said she was very sorry that she had left in such a way—in such a towering passion—and that if she could help him in any way she would be very pleased. He arranged that she was to come back for a week or fortnight at twenty-five shillings per week, and at the expiration of the fortnight she asked him if he should require her the following week. He told her he would consider whether he should engage her regularly, and told her he could not entertain the idea of giving a month's notice and receiving her in his permanent service, because she had deliberately walked out of his place when he had required her to do something he wanted done. She renewed the application on several occasions, but he never agreed to give her a month's notice, which she suggested. She was often in the habit of flying into a passion, and when he asked her to do anything without saying "Miss Heath" she would

not do it, and tell him she had a name. On the Friday evening he asked her to make out a bill, but she refused, and threw the pen across the table. He then told her he should not require her services after the following week. On the Monday morning he received a letter asking for some photographs, and he twice asked her to send them. He went to London that day, and on the Tuesday morning he found that she had not sent them, though she had sent others of no importance. It was her duty to post the parcels, and not the assistant. He also had sent a letter that morning complaining of some photographs being sent home unfinished, and in consequence of the complaint he did feel somewhat annoyed, and told her she did not do her work properly, she was injuring his business, he could place no dependence in her, and he could dispense with her services. He admitted he did tell her she had no written agreement, but that was to stop her tongue, which was rattling away at a great rate. Had told her a week's notice was no good.

His Honour said it was quite clear they were not going on harmoniously, and he was of opinion that the understanding was that there should be a month's notice. There would be a verdict for plaintiff.

Defendant asked whether he could take it to a higher court, but his Honour said he would not grant him a case.

Meetings of Societies.

WEST RIDING OF YORKSHIRE PHOTOGRAPHIC SOCIETY.

An ordinary meeting of the above Society was held on the evening of the 1st November, at the Victoria Hotel, Bradford,—Mr. J. W. Gough, the President, in the chair.

The minutes of the previous meeting having been read and confirmed, the Secretary read a communication, and laid on the table a chart, forwarded by Mr. D. Winstanley, showing the daily variations in the aggregate quantity of light radiated from the southern sky. The Society's thanks were voted to Mr. Winstanley for his kindness in forwarding the chart. Mr. Gott was then elected a member of the Society.

The usual thanks having been given by the members to the officers and councillors who had acted for the past session, the meeting then proceeded to the election of officers for the ensuing term, with the following result:—*President:* Mr. J. W. Gough. *Vice-President:* Mr. John Smith. *Treasurer:* Mr. H. G. Rogerson. *Auditor:* Mr. W. G. Thompson. *Council:* Messrs. A. Sachs, E. Greaves, T. Burrow, W. Smith, J. Howarth, E. Wormald, A. W. Beer, and W. E. Batho. *Secretaries:* Messrs. Crosthwaite and Holgate.

Some notices of proposed alterations in the rules having been given, the meeting, on motion, was adjourned.

The Society held its first annual meeting on Wednesday evening, the 17th November, at the Victoria Hotel, Bradford. After tea the company adjourned to the usual meeting room, which had been hung round with a large number of beautiful photographic productions. Colonel Stuart Wortley had kindly forwarded for exhibition a large number of instantaneous photographs of clouds and seascapes, printed in permanent chromotype by M. Lambert's process. Mr. A. L. Henderson contributed two fine cases of enamels. A number of excellent landscape studies, by Mr. R. Crawshay, also adorned one side of the room. Mr. Sachs exhibited a collection of children's portraits and a large autotype enlargement; Mr. Greaves a number of "imperials;" Messrs. Appleton and Co. a large transparency in carbon of full-length figure of a lady, intended for the decoration of a staircase window; Mr. Jennings, of Norwich, a number of eburneum pictures; and many other objects of interest were to be seen.

A pianist had been engaged, and during the evening a number of songs were tastefully rendered by some of the ladies present and several of the members, whilst others gave readings and recitations of a pleasant and humorous character.

Mr. Howarth gave a sciopticon exhibition of about half-an-hour's duration, with descriptive lecture by Mr. T. Burrow, during which time the company were in imagination transported to various well-known scenes. Some American views of snow and ice-bound rivers and cataracts were very highly appreciated.

A most agreeable feeling prevailed during the whole of the evening, and the hour of parting came only too soon, the company breaking up with mutual regrets, and wishing the Society renewed prosperity.

Another ordinary meeting was held on the evening of the 6th December, at the usnal place,—Mr. J. W. Gough, the President, in the chair.

The minutes of the last meeting having received confirmation, the Secretary read, as follows, the

ANNUAL REPORT.

In presenting this the first annual report your Council feel that they have cause to congratulate the Society upon the prosperous and successful commencement of its career.

At the first meeting the names of seven members were enrolled, and in twelve months the number has reached over seventy.

No society could have been more unanimous in its endeavour to communicate information amongst its members, nor could a more friendly and genial feeling have existed between them; at the same time, the Council would endeavour to impress upon each member the necessity for renewed exertion. Successful as the past year has been, the next should be more successful. Though much has been accomplished, still more remains to be done; therefore, let each member individually try to contribute something to the general advancement of the art.

During the year death has removed one of our members, Mr. G. Wade.

Papers have been read as follow:—

On Warming Studios, by J. Howarth.

On the Acceleration of Exposures, by W. H. Brunton.

The Woodbury Process, by W. E. Batho.

The Lambertype Process, by W. E. Batho.

The carbon process has been practically demonstrated by Mr. E. Greaves, a lantern exhibition has been held, and M. Lambert kindly attended at the October meeting to show his specimens and explain the utility of his method of working.

Outdoor meetings have been held at Bolton Abbey, Hebden Bridge, and Kirkstall Abbey.

The financial statement was then presented, which, along with the report, was adopted.

The Secretary then read a communication from the Secretary of the Photographers' Benevolent Association, which was intended to be read at the annual meeting, but arrived too late for presentation. It was resolved:—"That a box be placed on the table at each meeting for the receipt of voluntary subscriptions in aid of the funds of the Photographers' Benevolent Association." Mr. Smith, Vice-President, kindly volunteered to supply the box.

Mr. Howarth exhibited several landscape negatives recently taken by the process published by Mr. M. Carey Lea in 1870, which were considered by many members as equal in quality to any they had seen produced by more recent formulæ.

The President then stated that, owing to business engagements, he would very shortly have to leave England for India for a few years, and therefore had to tender his resignation as President of the Society. He regretted extremely the parting with the Society, as he had formed some most agreeable aquaintanceships, and would have to leave many friends to whom he felt closely allied. He would, however, still keep up a correspondence with them, and though absent in body would still be with them in heart.

Mr. Smith then moved that the heartfelt thanks of the Society be presented to the President for the invaluable services rendered by him to the Society, of which he was the founder. He (Mr. Smith) felt a deep interest in his welfare, and sincerely hoped that the undertaking in which he was about to embark might prove successful. Four years was a long time to be absent from the Society, and many changes might take place during that time; but he trusted that Mr. Gough would safely return and again resume his seat amongst them as a member of the West Riding of Yorkshire Photographic Society.

The motion was seconded by Mr. Howarth, and unanimously carried.

The President having replied,

The meeting was then adjourned, and resolved itself into a committee, Mr. Smith presiding, to consider some means of intimating to the President the esteem in which he was held by the members.

A special meeting was held at the Victoria Hotel, Bradford, on the 20th December, for the purpose of presenting the retiring President with a slight acknowledgment of the numerous services for which the Society was indebted to him.

Mr. J. Howarth (having been voted to the chair) rose to explain the circumstances that led to the meeting by saying that the members, in committee, had felt that they should not permit the President to retire from office without presenting him with some recognition of his official competency. As the time had been so limited it was decided that an album should be purchased, in which the members might place their portraits, as an interesting *souvenir* of those connected with the Society.

A considerable sum was subscribed, and amongst those members to whom application had been made were Messrs. Harvey, Reynolds and Co., of Leeds, who, through Mr. Scorah, their manager, most generously presented a magnificent and valuable album for the purpose of the presentation, and therefore the sum subscribed for that purpose was left in the Treasurer's hands. Part of the amount had been appropriated to the purpose of having the presentation address handsomely illuminated on the title-page, and the remainder of the subscription it had been resolved should be presented to Mr. Gough in a purse, as the Committee had not time to decide upon a more suitable way of expending it.

The Chairman then called upon Mr. Smith, the Vice-President, to make the presentation.

Mr. Smith, on rising, said he knew of no more pleasant duty than that of indicating the respect and esteem in which they held another person, more especially when that person had undoubtedly proved himself worthy of such esteem; and such a position was the one then occupied by the late President of the Society. He (Mr. Smith) then went on to say that parting with dear and admired friends always left on the mind very painful reminiscences, especially when such friends had occupied a high and useful position, and when valuable services had been rendered by them. When a scheme was launched it appeared a simple

undertaking; but to look on it achieved, and to actually do the work, were two very different matters. Mr. Gough had energetically set himself the task of establishing a society in Yorkshire; he had had many difficult and trying ciruumstances to contend against, but had at last the satisfaction of looking on his completed labours—an established and prosperous Society. What changes the future might work was unknown to them all; but he hoped Mr. Gough would return in full health and vigour, and show them many examples of his work in distant countries. The members of the Society owed him a debt they could not repay, nor had they met that evening with any intention of endeavouring to repay it, but simply to hand over a small memento of their large affection for the recipient. The gift must not be measured by its intrinsic value, but by the intentions of the donors, as indicating their profound feelings of obligation to the retiring President, to whom it would, doubtless, be a pleasure to look upon the "counterfeit presentment" of those with whom he had been accustomed to meet; and he had no hesitation in saying that the members, one and all, sincerely hoped they might, after the lapse of time, have the pleasure of again seeing Mr. Gough's face and enjoying his company for many years to follow. He (Mr. Smith) then read the address, which was superbly illuminated on the title-page of the album:—

"Presented to J. W. Gough, Esq., by the Members of the West Riding of Yorkshire Photographic Society, as a slight intimation of the esteem in which he was held as its President and Founder, wishing him, at the same time, every success in his Indian undertaking."

The album and purse were then handed to Mr. Gough.

Mr. J. W. Gough, in reply, said he appreciated highly the feelings which had prompted the (to him) unlooked-for gift. He had been connected with many photographic societies, but had never met with more good fellowship and genuine friendship than during his connection with the West Riding of Yorkshire Photographic Society. There were, he was convinced, no warmer hearts than those of Yorkshiremen; and he should feel, as he looked over the collection of portraits just presented to him, that each one was his personal and intimate friend. He certainly should, during his stay abroad, communicate with the Society, and consider himself as one of them. He (Mr. Gough) concluded by saying that he rendered his deep and heartfelt thanks for the valuable and interesting memento of his connection with the Society.

The meeting then became of a social character, and an extremely pleasant evening was spent, the proceedings being interspersed with speeches and songs by several of the gentlemen present.

Correspondence.

Action of Boric Acid.—Influence of Sensitisers.—Alkaline Development.

Gelatinisation of Collodion: Action of Boric Acid.—It is well known that collodion—especially that made with cadmic salts—will sometimes be found to have gelatinised by standing, though why this action sometimes takes place and sometimes does not has not been made out.

I have lately found that *boric acid* has a very remarkable power of causing collodion to gelatinise. So small a quantity as two grains to the ounce will cause a collodion to solidify so completely in twenty-four hours that not only the bottle may be inverted without the collodion becoming detached, but considerable force is needed to dislodge it. This is a true gelatinisation, not merely a thickening up, as becomes evident if a quantity of ether be added; the jelly entirely refuses to dissolve again. It may be broken up by violent agitation, but remains as lumps and fragments in the liquid.

As the jelly is quite as firm as that of gelatine it seems possible that it might replace the latter substance in the collographic operations now coming so largely into use. Most persons must have observed that an ordinary negative often shows depressions and elevations corresponding with the image; but ordinary collodion will not hold liquid enough to cause these elevations and depressions to be otherwise than slight. With a collodion treated with boric acid the case is very different, and it would doubtless show far greater differences of level. Sensitising with silver seems to have the same effect of producing relief with collodion that potassium bichromate has with gelatine; and as the boric collodion remains for a time properly fluid there is no difficulty in extending it over glass. The reaction appears to be worthy the attention of those engaged in collographic work, and might, or might not, prove better to the ordinary gelatine process. For myself, I have not the time to experiment further with it.

Action of Sensitisers or Preservatives.—Under different conditions the action of any one preservative (more properly sensitiser or accelerator, since it is not in any sense a "preservative," but often diminishes the keeping properties of a plate) may differ very much, and this gives rise to much difference of opinion as to the value of these substances. Some time back I expressed the opinion that there was no best preservative, and no proportion of excess of silver nitrate which was necessarily the best, but that the two substances, silver and preservative, must have a due relation to each other. To this I have now to add that the action of "preservatives" upon an emulsion is entirely different, according as it does or does not contain silver nitrate in excess. An emulsion which is prepared with excess of alkaline bromide, or to which a chloride has been subsequently added in quantity sufficient to decompose all the silver nitrate present, will be acted upon in an entirely different way from one that has silver in excess; in fact, upon the former class preservatives have very little effect of any sort. The characteristic action of an emulsion made with silver nitrate in excess is not destroyed by washing out that excess with water to nearly so great an extent as when the excess is removed by an alkaline or metallic bromide or chloride; but still the action of a "preservative" seems to be distinctly greatest when it is applied in presence of free silver nitrate.

In general it may be said that the *abstract* sensitiveness produced by a preservative increases in proportion to the quantity of free silver nitrate present; but this is not the case with the *useful* sensitiveness. Some "preservatives," as we increase the dose of silver nitrate, rapidly reach a stage at which they give thin images difficult to intensify, with a tendency to fogginess.

Development.—It is well known that different systems of dry-plate work do best with different developments, and my recent examinations have enabled me to trace a definite law connecting these points, which will enable us to say beforehand what sort of development will be proper in any given case. It is this:—*The larger the excess of silver nitrate used in making the plate, the less the quantity of pyrogallol that should be used in the development, and the more ammonium carbonate it will bear.*

In some remarks lately sent you on alkaline development I described experiments showing the singularly small quantity of pyrogallol that will give good results with plates made according to my washed emulsion formula (one-sixth of a grain to the ounce), and that the best results were with proportions not exceeding one-half of a grain to the ounce. These results were entirely confirmed by experiments made by the Editors and published in a subsequent number. This is because the formula of that emulsion includes a liberal excess of silver nitrate. On the other hand, and for the same reason, these plates will bear a larger proportion of ammonium carbonate than some others. I do not mean an exaggerated quantity, but the dose may be raised as high as four or five grains to the ounce.

But when plates are made with but a small excess of silver nitrate I think the opposite treatment will be found to give the best results; that is, the pyrogallol must be used more liberally and the ammonium carbonate more sparingly. If the proportion of the latter be raised above two or three grains to the ounce the development will scarcely be so satisfactory; it may even be arrested, and in some cases I have even seen the image recede and lose in intensity. This is, however, an exceptional case, but that it can occur there is no doubt.

Philadelphia, January 10, 1876. M. Carey Lea.

THE COMPARATIVE AFFINITY OF THE HALOGENS FOR SILVER.

To the Editors.

Gentlemen,—In reply to your observations appended to my letter of the 15th inst., inserted in your issue of today, I beg to observe that the views I hold on this subject are by no means new (at all events as regards the principle involved), nor do I put them forward as such. The position of the halogens in chemistry, and their relations one to another, have long since been determined by those chemists who have investigated the matter. My views on the subject in hand are in perfect accord with such determinations, and consequently for you to ask me for *proof* is just about as reasonable as if you were to ask me for proof that the earth is a sphere, in contradistinction to those who affirm it is not, seeing that you can readily ascertain for yourselves what the accepted doctrines of chemists are by consulting any standard chemical work.

I did, however, give you one proof, viz., that iodide of silver is converted into chloride by treatment with a mixture of nitric acid and common salt, the iodine being liberated; but with this you do not attempt to deal, probably from not having had time to try the experiment.

As regards the facts which you adduced to support your theory in your issue of the 14th inst., I have shown that they are both capable of explanation without in any way doing violence to generally-accepted

chemical dogmas, and if such be merely a "difference of opinion, of little value in argument," then we must be content to differ.—I am, yours, &c., WM. ROBINSON.

Liverpool, January 21, 1876.

[We must still adhere to our previously-expressed opinion upon this subject, merely pointing out to our correspondent that it is rather with him rests the onus of proof. He has brought forward but one argument, which, as we have pointed out, is valueless. If, after perusing the independent testimony of Mr. G. W. Webster, Mr. Robinson still retain his former opinion, we presume that we *must*, then, "be content to differ."—EDS.]

MR. BATHO'S PHILOSOPHY.

To the EDITORS.

GENTLEMEN,—I am sorry to see from the letter of Mr. W. E. Batho, of Halifax, published in last week's number of THE BRITISH JOURNAL OF PHOTOGRAPHY, that he has taken my mild attempt at what I thought not an unseasonable joke in downright earnest. Since, however, *he* really seems to have been in earnest when he wrote the exceedingly curious account of the doings of a particle of smut, it will not do to let him think that a number of big words will take the place of proof of such unaccountable vagaries. I do not, of course, know the extent or quality of the philosophy imbibed by Mr. W. E. Batho, and am sorry to confess myself equally ignorant of the kind of *attraction* which could produce the wonderful phenomenon he encountered.

I may not quite understand the Halifaxian philosophy, and have yet much to learn of that generally current on this side of the Tweed; but, taking a hint from Mr. Batho's letter, I have sat for an hour or two at the feet of several of our most noted philosophers, and have heard iterated only the old story, that attraction and gravitation, if not two names for one manifestation of force, are as closely related to each other as the twin sisters one of whom had to get a patch put on her dress to enable the friends of the family to distinguish between the two.

Neither am I quite clear as to the "force" at which our friend hints. Perhaps he means that by which spiritual manifestations are said to be produced. If so, then he leads where I must decline to follow. The idea, however, will help me to dismiss the smut business, so far as I am concerned; and I beg to do so by saying of it what I have always said of spiritual manifestations, viz., that I do not say it is not true, only that I do not believe it. Evidence on which, if I were a juryman, I should unhesitatingly consign a man to the gallows would not convince me that Mrs. Guppy was conveyed from one part of London to another by any other than natural means; but, of course, if I had an opportunity of personally seeing the wonderful act of levitation, doubting would give place to faith, or, rather, to knowledge, and I should become a believer.—I am, yours, &c., JOHN NICOL, Ph.D.

Edinburgh, January 24, 1876.

THE AUTOTYPE PROCESSES AND PATENTS.

To the EDITORS.

GENTLEMEN,—In a letter in your last issue, signed "The Autotype Company," it is announced that for the future those who wish to make photographs in permanent pigments must obtain a license to do so; and in another page I see that the license fee required from professional photographers is £30.

The Autotype Company has always claimed credit for its liberal policy in allowing the use of its patents to those who purchase the materials from themselves—at a price, of course, fixed by themselves, and therefore, also, of course calculated to repay *all* costs. But it now appears that this "liberality" was only to continue through the "experimental stage," and that as soon as a sufficient number of confiding photographers have purchased the appliances, and passed through the difficulties of working the process, they are to choose (and that without any notice) between discontinuing carbon printing and the payment of this new demand.

The reason, or excuse, for making this charge, given at the conclusion of the letter, does not appear quite candid. It is said that a sum of from twenty-five to thirty thousand pounds has been spent, so far, in perfecting carbon printing, and that the time has come for a reasonable remuneration to accrue to those who have spent their money, &c. Now it is generally understood that those (or he?) who started the Autotype Company did spend about the sum named, but, disheartened by his or their losses, sold the whole concern to the present proprietors for not more than the value of premises, plant, and stock. If it be really intended, however, that the "reasonable remuneration"—£30 per photographer—is to accrue to those (or to him?) who spent so much money, it is a pity that this was not made plain in the Company's letter, so that photographers might have felt this consolation at having to "part."

After all, however, is it necessary to yield to this demand? The claimed patent rights divide themselves into three heads:—1st, the manufacture and use of carbon tissue by single transfer; 2nd, Johnson's double transfer patent; 3rd, Lambert's chromotype.

To take the last-named first: the two points claimed by the patent are the intensification of a transparency by means of permanganate of potash, and the transfer of the carbon print on to a paper on which a pattern or design is already lithographed or silver printed. Does anyone really want to use either of these "inventions?" or could they be seriously claimed as new?

Next, as to Johnson's double transfer patent. Perhaps an examination of the file of your Journal about the time the patent was published would be of use in forming an opinion. But another question arises—Is it *necessary* to use double transfer at all? Why not strip the negative and print by single transfer? The expense and difficulty of printing are considerably lessened; and, if done upon a fine surface, the result is, in my estimation, at least as good as by Lambert's or any other mode of double transfer, and superior in one respect, viz., purity of the lights. Has a vignette with a clean white background ever been shown produced by double transfer? If so, I have not seen it.

There now remains to be considered the patent claims for the manufacture and use of carbon tissue by single transfer. What was the opinion as to the validity of these claims of the senior partner in the Autotype Company before he purchased an interest in the concern may be known from the fact that he openly made, used, and advertised tissue in defiance of the patents; and I have no doubt he acted under good legal advice. At all events the Company did not bring an action to defend such claims.

The past "liberal policy" of the Company has had its reward in preventing the validity of its patents from being generally contested, and in keeping the trade in carbon tissue almost entirely to itself. It is probable that now, however, other manufacturers will arise, or that some large users who have hitherto made for their own use only will offer their tissue to the public, and, probably, at a somewhat lower rate; so that, by using cheaper tissue and single transfer, permanent prints may be produced at a cost not much exceeding that of silver printing.

Another point in favour of single transfer is that the prints have (to my mind) a greater promise of permanence than those having a collodionised surface. It may be remembered that Swan's prints were introduced as undoubtedly permanent; but after a few months the collodion and pigment cracked away from the paper, leaving the print in a far worse condition than an ordinary silver print would have been. It does not seem so likely to occur with the present mode of applying the collodion; but I certainly think that single transfer prints may be more safely issued as permanent.—I am, yours, &c., EXAMINER.

Glasgow, January 24, 1876.

Miscellanea.

OBITUARY.—We regret to learn of the death of Mr. T. H. Hennah, of Brighton, which event took place during the first week of the present month. Mr. Hennah was one of the earliest writers on the collodion process, a pamphlet which he published many years ago containing directions which, for clearness and force, have never been surpassed.

THE BABYLONIAN CODEX.—The *Athenæum* says that the Russian Government, ever ready to advance the cause of science for science's sake without any regard to pecuniary considerations, is about to place the student of biblical literature under a new and special obligation, by undertaking a splendid photolithographic edition of the famous *Codex Babylonicus*, now in the Imperial public library of St. Petersburg.

MR. PARKER'S PHOTOGRAPHS OF ROME.—According to an article in *Forbe's Tourists' Directory* it appears that many of the glass negatives of Mr. Parker's valuable series of historical photographs are completely spoiled, owing to an English varnish having been used for them which was not suited for the hot climate of Rome, and during the last summer this has cracked all over, so that they can never be printed from again. They were the sole representations of many objects of interest for the architectural history of Rome, some of which could only be seen for a short time, and will never be visible again; and they were also of great importance for the history of art at a period in which no other record of it exists. It is in these photographs only that one can see the actual touch of the original artist in frescos, and detect any change that has been made. Those who possess sets of them may well congratulate themselves. It will in future be impossible to make up a set, and we hear that there are not more than half-a-dozen sets in existence, of which three are in Oxford, one in Rome, and one in the possession of Miss Hill, an English lady of property, who subscribed for them regularly from the beginning, and said the more she could get the better she would be pleased; but she has been the only person who has shown good sense in purchasing a set. There are considerable parts of sets in the South Kensington Museum, and at Boston, in the United States.—*Architect.*

EXCHANGE COLUMN.

No charge is made for inserting these announcements; but in no case do we insert any article merely *offered for sale*, that being done at the small cost of one shilling in our advertising pages. This column is devoted to exchanges only. It is imperative that the name of the person proposing the exchange be given (although not necessarily for publication, if a *nom de plume* be thought desirable), otherwise the notice will not appear.

I will exchange three new double dark slides, $8\frac{1}{2}$ by $6\frac{1}{2}$, fitting a Kinnear camera, for a No. 4 or 5 Ross's symmetrical lens. Difference adjusted in cash. Also two glass transparencies, *Ruins of Paris*, the owner having duplicates, for two others—Breese's preferred.—Address, W. G., Gas Offices, Torquay.

ANSWERS TO CORRESPONDENTS.

☞ *Correspondents should never write on both sides of the paper.*

Notice.—Each correspondent is required to enclose his name and address, although not necessarily for publication. Communications may, when thought desirable, appear under a *nom de plume* as hitherto, or, by preference, under three letters of the alphabet. Such signatures as "Constant Reader," "Subscriber," &c., should be avoided. Correspondents not conforming to this rule will therefore understand the reason for the omission of their communications.

J. A. Forrest.—Thanks.

D. K. Griffith.—Received. In our next, if possible.

W. G. (Torquay).—If you send the letter it will be forwarded.

B. A.—The lady respecting whom you inquire is engaged at Portsmouth.

D. P. P. A.—Try the effect of acidulating the bath. If this do not prove a remedy try another sample of paper.

F. J. O'B.—A very thin sample of macintosh cloth will answer better than any other material for covering a pocket tent.

X. Y. Z.—We quite misapprehended your meaning, but this was entirely owing to the fact of your writing being well-nigh undecipherable.

J. C. B. (Camborne).—The first of a short series of articles on the subject of your inquiry is to appear very soon—if possible, at the beginning of February.

W. N. Tiddy.—The only method known to us by which the required degree of sensitiveness can be obtained is by coating the paper with gelatino-bromide of silver.

*** We have again to request numerous contributors to exercise patience, as we have many communications in type for which we have been unable to make room in the present issue.

Adolescens.—It cannot have been nitrate of uranium you received from the chemist, as it answers neither to the colour nor the properties of that salt. It is a yellow salt, and is very soluble.

B. Henry.—1. Having carefully examined the sample of nitrate of silver sent, we have no hesitation in pronouncing it to be pure.—2. The method we employ is that known as the "volumetric."

C. P. P. A.—The majority of "experts" use chlorine water; but, from recent experiments we have made, we incline to the belief that peroxide of hydrogen will answer better. We have, however, succeeded quite well with both.

Rev. J. B.—The proportions by Mr. Woodbury are four ounces of Nelson's opaque gelatine dissolved in a pint of water. To every four ounces of this solution must be added sixty grains of bichromate of ammonia dissolved in warm water.

Iron.—There is no difference between the taking of "Rembrandts" and other portraits; it is merely a matter of lighting. Obtain a good specimen, and, having posed your sitter, proceed to arrange blinds in such a way as to light your model in a manner similar to the specimen.

Microcon.—The cause of the failure is to be found in the fact that the more frequently the solution of gelatine is heated the less chance there is of its subsequently setting as a jelly when cold. For your purpose dissolve no more gelatine at a time than you are likely to use.

C. P.—1. The proposed dark room will prove to be a very excellent one.—2. Let the counter be made of wood, and do not line or cover it with metal.—3. We have forwarded to the gentleman chiefly interested that portion of your letter which refers to the non-receipt and return of your letter of the 12th, and we have requested him to communicate with you. The address given in the advertisement is quite correct.

J. Renton.—The process was patented, and the details were published to a certain extent only; for, owing to an accident of a very peculiar nature, a further and most important discovery in connection with the original one was made on the evening of the day on which the patent was obtained, and the patentee, considering its discovery to be well-nigh impossible, determined upon working it as a secret method. When we receive the permission of the discoverer to do so we shall gladly publish full details.

P. B. Farquharson.—While we are quite familiar with the whole of the practical details connected with the method of producing surface-blocks in zinc, it would be quite impossible in the space we can devote to these "Answers" to enter into such details as would be of much use to a practical letterpress printer like yourself. The under-cutting of the lines arises from your not employing an etching solution of a proper kind, or from not using it rightly. We cannot undertake to give practical instructions in the etching of printing surfaces, although we are willing to afford you all the assistance we can short of that.

Photolitho.—The process described by you is certainly sound in principle; it will also prove quite excellent in practice. So far the ground is firm under your feet. You say "I believe it to be new." That is just where we must interpose and dash away the alluring cup. We read your letter to a patent agent, and he smiled, saying—"Why, this invention has been patented already a score of times!" We think he has over-stated the facts, but we know that it has been patented at least, if not more than, twelve times. One of the patents very nearly afforded an opportunity for an excellent display of forensic eloquence at the Kingston assizes last summer, but the case was, very unfortunately, compromised.

Quiz.—This correspondent wishes to become "an inventor or discoverer," and inquires in what way he can best attain his end. The most obvious reply to his query would be—*invent* or *discover* something useful. But as this is a platitude, for the utterance of which he will scarcely thank us, we may direct him to fields that are but yet half worked, such as the obtaining of substitutes for collodion and gelatine with which to make sensitive emulsions. And the allusion to this reminds us that we have secured some remarkable results with the gluten of wheat, and if "Quiz" will work in that direction we can hold out a reasonable prospect of acquiring both fame and the gratitude of a large number of photographers.

N. B.—Having rolled the silver into sheets, proceed as follows:—Into a very hard and well-glazed porcelain vessel pour some nitric acid, and add to it a *little* water. Now immerse the silver and apply heat gently, when the metal will rapidly dissolve. A small plate of glass ought to be placed over the vessel. When the whole has been dissolved the crystals will form on the application of heat. This is only an outline of the method of preparing nitrate of silver; but we strongly advise you not to attempt its preparation, for, with your want of experience, it will both cost you much more than if it were purchased and it will be greatly inferior in quality. Should you make the attempt, however, you may calculate upon getting nearly forty ounces of the nitrate.

The Autotype Process and Patents.—We have received numerous letters of inquiry concerning the recent determination of the Autotype Company to make a charge for permission to work such processes as they have patented, or of which they hold the patents. This decision is considered by our correspondents to be a retrograde step, and we have been asked to make some comments upon it; but information received just before going to press has reached us at such an hour as to render it impossible to do so this week, and this is now the less necessary inasmuch as the information given in the Autotype Company's advertisement in the present number is so comprehensive as to anticipate almost all inquiries that can be made. To this advertisement we direct attention. We are glad to perceive that a decided spirit of liberality pervades the Autotype Company's treatment of photographers. Amateurs, in particular, will be quite as well off as they were previously.

Received—(too late for reply this week):—Colonel F. S. K.; Herbert B. Berkeley; B. S. W.; and F. G. These in our next.

OUR ALMANAC FOR 1876,

Edited by J. T. Taylor,

In addition to the work containing the largest number of original articles that have ever been included in any Photographic Annual—articles which are copiously illustrated by wood engravings—it is embellished by Mr. R. Faulkner's Celebrated Portrait Picture—

"SIMPLICITY" (DOROTHY MORRISON).

This charming pictorial work was universally pronounced by critics and the newspaper press to be the gem of the late Photographic Exhibition. The negative has been kindly lent by Mr. Faulkner, and the prints have been executed by the mechanical process of Messrs. Taylor Brothers, Fox, and Co., Victoria Works, Forest-hill, S.E.

Including text and advertising sheets the work forms a volume of 336 pages.

Price One Shilling; free by post, 1s. 3d.

METEOROLOGICAL REPORT,

For the Week ending January 26, 1876.

Observations taken at 406, Strand, by J. H. Steward, Optician.

These Observations are Taken at 8.30 a.m.

Jan.	Bar.	Wind.	Wet Bulb.	Dry Bulb.	Max. Tem.	Min. Tem.	Remarks
20	29·91	W	44	46	47	42	Dull
21	29·71	SW	44	46	47	44	Dull
22	30·19	NE	35	37	42	34	Cloudy
24	30·50	W	41	43	52	38	Cloudy
25	30·54	S	35	36	45	35	Foggy
26	30·38	SE	39	40	44	35	Fine

CONTENTS.

THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 822. Vol. XXIII.—FEBRUARY 4, 1876.

ON THE ACTION OF PRESERVATIVES.

The question of the so-called "preservative" is one of the, if not *the*, most important in connection with modern dry-plate photography. We say "modern" because, though ever since the introduction of the first dry process the preservative has been considered an indispensable feature, it is only, comparatively speaking, very recently that its independent chemical function has been recognised. By "chemical function" we mean the effect produced by the preservative upon the rapidity or density of the dry film, in contradistinction to its mechanical action in keeping open the pores of the collodion.

Here we may introduce a few words as to the correctness of the term "preservative." Very many writers have objected to it on various grounds, and have suggested others in preference, amongst which we may mention "organifier," "sensitiser," "accelerator." It has been strongly urged that "preservative" is not only a misnomer, but that it in many cases produces an exactly opposite effect. How then came this name into use? We can answer the question very shortly. In the early days of the collodion process, when the collodion itself was but little understood, and when suitable pyroxyline for dry-plate work was a thing unheard of, it was found impossible to develope a satisfactory image upon a collodion film which had been dried previous to exposure and development unless before desiccation it was treated with a saccharine or gummy solution, in order to fill the pores of the collodion with soluble matter, so as to prevent the too great contraction of the film, and to render it permeable to the developing solution. This solution, therefore, *preserved the film in a state capable of development*, and hence the name "preservative."

The conservatism of photographers generally has caused them to adhere to the original title long after the merely mechanical effect ceased to be the principal fount of utility in the employment of such solutions, and we think it is high time that a distinction was made between a "preservative" and an "organifier." The former we may consider in its strictest sense, as explained above, to be out of date—obsolete; for it is quite possible, at the present time, to produce a collodion which shall give a film capable of use, dry, without resorting to any extraneous means for rendering it porous or permeable to the developer.

Major Russell was, we believe, the first to notice the difference between a preservative and an organifier, both functions being displayed by his favourite tannin. This substance, as everyone knows, forms an excellent "preservative," drying into a thin, hard, glassy varnish, totally devoid of structure; while Major Russell pointed out that it might be washed off the plate previous to drying—in which case the so-called preservative action is lost—and yet produce an effect upon the character of the picture. This we may consider as the simplest action of the organifier. Of late years, however, an entirely new style of organic action has been introduced, more especially into emulsion work, in which the "organifier" is allowed to act upon the film in the presence of free silver, forming a complicated compound incapable of analysis, yet serving to point the difference between the two descriptions of organifying action.

It has, further, been proposed to substitute the names of "accelerator" or "sensitiser" for that hitherto in use, and our correspondent, Mr. M. Carey Lea, renews this suggestion in our last number. The idea is based upon the well-known and indisputable fact that with different organic substances very varying degrees of rapidity are obtained; hence the supposition that certain substances possess accelerating properties. This view, however, we scarcely hold as tenable—at least with regard to the organic substances hitherto principally employed. That different degrees of sensitiveness are conferred by different substances is, as we have stated, indisputable; but such result is not produced by the *accelerating* effect of any one class of substances, but by the *retarding* effect of others. In proof of this take, for example, tannin. Let three plates be coated with the same emulsion and washed as usual, each receiving the same treatment in that respect. Let one plate be drained and dried without any preservative, the other two to be passed through a solution of tannin of from ten to fifteen grains to the ounce—one to be dried at once as it comes from the tannin solution, the other to be washed first. If the three plates be exposed under similar conditions it will be found that the one which was not submitted to the action of tannin will possess the greatest amount of detail, though as regards density and printing qualities it may be inferior to the other two, while densest and slowest will be the one which was dried without washing off the preservative. This shows distinctly that tannin, at least, is not an "accelerator," though it is, perhaps, the most powerful "organifier" in general use.

But it may be urged that all preservatives do not act in the same manner as tannin. We are quite prepared to agree with this objection; but adhere to the statement made above—that no purely organic substance, when used in the ordinary manner as a preservative, is capable of *increasing* the sensitiveness of the dry-plate film, though many act as retarders. We do not, of course, refer to the addition of organic substances, such as lactic or malic acids, to the collodion or emulsion. These are not preservatives; but, even if used as such upon films containing free silver, the organic salt formed does not conduce to *rapidity*, though it may to *density*. It has been stated that such additions are valuable as improving the sensitiveness of an emulsion; but we are not prepared to agree with that dictum. It is rather, as we believe, the increased vigour conferred by the organic silver compound which leads to a misapprehension of the real comparison.

But, to practically test the matter, let an experiment be made with any of the preservatives which are stated to conduce to greater rapidity. If any such solutions—such as gum, coffee, morphia, laudanum, &c.—be applied to a film, either with or without excess of silver, it will in no case be found that the preservative gives greater rapidity, though, from the superior density of the "preserved" plate, it may appear, at first sight, more fully exposed than a similar plate not organified. Upon close examination it will, in many cases, be found that the organifier detracts from the sensitiveness of the plate.

Some years ago tannin was put forward as a "sensitiser" of pure iodide of silver, it having been believed that that salt in the absence of free nitrate, and more especially in the dry state, was insensitive to light; but under the influence of a wash of tannin it was found to be impressible. How far the designation of "sensitiser" may

have been appropriate we shall not now stay to argue; but it is tolerably evident that the action, whatever it may be, is not in the least analogous to the ordinary effect of tannin when used as a "preservative" or "organifier." Tannin is known to possess to a certain extent developing powers, and it is probable that in the case of silver iodide this power may be exerted more powerfully than in the case of bromide, or that its presence in connection with the ordinary development may assist an otherwise too feeble action.

We wish chiefly to distinguish between the action of an organifier in the presence of free silver and in its absence. In the first instance, it is tolerably clear that the action depends upon the union which takes place between the organic matter and the silver; but in the absence of a soluble silver salt the undoubted effect produced by the use of certain substances is not so easy of explanation. We have previously endeavoured to show that the result is in no case in favour of increased sensitiveness—that, in fact, the film is not rendered more easily impressible; hence we must suppose that any effect produced by an organifier in the absence of free silver must be traced to its co-operation with the developer after exposure.

This view of the question is supported by the action of the ordinary developers under the addition of various organic substances usually employed as preservatives. Take, for instance, tannin. If this substance be added to the ordinary alkaline developer it will be found to retard the operation, at the same time adding to the density of the image. It may, indeed, be employed as a substitute for soluble bromide as a restrainer. In these respects it corresponds fully with its action as a preservative. Again: by the addition of a small quantity of albumen to the developer an approach is made towards the effect usually obtained upon albumenised plates, while the development goes on slowly and with great regularity. Gum arabic, which is generally taken as the most rapid of preservatives (in our view the one nearest to neutrality) is without perceptible effect when added to the developer.

Closely connected, but not identical, with the subject of preservatives is the addition of organic substances to the emulsion, as already mentioned. Such substances are used as "organifiers," but not in any sense as "preservatives;" while it is equally certain that their function is to confer density, not sensitiveness. It has been recently proposed in America to add certain inorganic substances to emulsions, in order to shorten the exposure in the camera; but the *data* given so far are of so uncertain a nature, and the results reported so equivocal, that we must for the present pass the propositions over.

We have been induced to make these remarks by the suggestion of our correspondent, Mr. M. Carey Lea, last week, to call preservatives "accelerators." Much as we value the opinion of our friend, and little as we like to run counter to his ideas, we must take exception to his suggestion, and have given above our reasons for so doing. We hold a very strong opinion that the silver haloid itself is the agent upon which depends rapidity, while the organic compounds inseparable from a sensitive film give the necessary density, at the same time behaving more or less as retarders, in no instance increasing the normal rapidity of the film, whether wet or dry.

"THE BARONET'S CAMERA-STAND."

We make no apology for reverting to this matter so soon after having previously devoted an article to it, for the subject of camera-stands is one that will bear repeated examination without becoming exhausted.

The publication of the description of Mr. Kennett's stand has prompted several communications on the subject, some of them containing suggestions for slight modifications. Among others we have received a letter from Sir Thomas Parkyns, who, a few years since, introduced a camera-stand so nearly similar to Mr. Kennett's that, in order to the clear understanding of the points, we here give a copious extract from the former gentleman's communication. Sir Thomas says, *inter alia*:—

"The only difference as regards the sliding part of the leg between Mr. Kennett's stand and mine is in the mode of securing the centre limb, and I regret to have to express a doubt as to his answering, especially in moist weather or situations. I have, when photographing in torrents and woods, found my own (much more simple than Mr. Kennett's) stick rather too much for easy arrangement without some little extra trouble; but, by pulling outwards the two outer limbs, the centre one is easily set free, as all are perfectly smooth and plain. The legs of my stand were manufactured by Mr. William Morley, and advertised by him in his catalogue as 'The Baronet's Stand.' Since I gave him the pattern, however, I have made another improvement which Mr. Morley has not seen, enabling me to tilt the camera to any reasonable extent, so much so that I should be able to take the top of the spire of Salisbury Cathedral from about half the distance I could before have done. There is also a levelled revolving block, turning in a brass socket, on the top of the head for taking panoramic pictures on any number of plates without moving the stand (or for shifting the point of view when firmly placed and levelled in difficult positions), thus securing a fixed point for the whole series. By this means I was enabled to take a panoramic view of the whole Bay of Sanremo from the pier on four 10 × 8 plates, all of which fitted exactly.

"I write this letter in order that you, Mr. Kennett, and any other of my photographic brethren may be able to avail yourselves, if desired, of any of the hints contained in it; and I shall be happy to forward you my small mountain camera-stand legs so that you may inspect them for yourself. I have a second set, by means of which I can raise the centre of my ground-glass screen to seven feet from the ground. This I have found invaluable for taking interiors. These latter legs are but little heavier than the smaller ones, only the length of the wood making the difference. When I take a panorama (as at Sanremo) on a hard surface I load the legs with stones or anything available; then level the camera, which is most easily done by means of the little screws, allowing the centre limb to slide up or down; then raise or lower the sliding front according to circumstances, and proceed to work without the least fear of any movement whatever."

Since the receipt of the above letter we have been in communication with Sir Thomas Parkyns, and have received from him "The Baronet's Stand," which we have his permission to retain in our office for a week previous to returning it, so as to enable those desirous of seeing it to do so. It includes certain features well deserving of examination. The points in which it differs from the stand of Mr. Kennett are these:—Each leg is attached to the top of the stand by means of a small bolt which is pinched tight by a winged thumb-screw; and a similar screw, of a T form, serves to bind the sliding portion. There is no mistake as to the power and rigidity secured by using these screws. By means of a nicely-fitting centre block the camera may be rotated on the stand with great ease.

A valuable feature in "The Baronet's Stand," and one to which we direct special attention, is the facility with which it permits the camera to be tilted to a considerable extent. This feature is thus described by Sir Thomas Parkyns:—

"If you tilt the stand too much you will find it fall backwards; but, if you remark the main block at the top *on the underside*, you will see that it is cut away for one leg. Pull that leg back, and place the other two forward, and you will see the difference."

By the ingenious "dodge" here described the camera may be tilted very considerably without the drawback usually experienced when doing so, namely, a great depression of the camera owing to the pulling back of one or two of the legs. By the method adopted by Sir Thomas Parkyns this lowering is avoided, while the most perfect rigidity is maintained. This is a point deserving high commendation.

ON TURMERIC.

We are aware that the colouring matter of turmeric (the *curcuma longa* of the pharmacopœia) has been more than once recommended as a substance likely to be useful in photographic work; but we hardly think it has received proper consideration, or that it has been utilised to the extent which its varied qualities would seem to warrant.

Our attention was recently attracted to the subject in consequence of a desire to protect by a yellowish varnish the very thin foreground of a negative we wished to print. For this purpose we added a few drops of a tincture of turmeric to a little plain collodion and poured

it over the whole plate. When dry, portions covering the better-exposed parts of the plate were scraped off, and the negative exposed under paper in the ordinary way. On examining the process of printing we were somewhat surprised to find that, although the yellow film was exceedingly feeble, its non-actinic qualities were so great that when the unprotected parts of the negative were fully printed the parts covered by it were altogether untouched, and that even after an exposure of two hours to full sunshine there was no trace of decomposition of the silver chloride. This circumstance naturally prompted us to make a series of experiments, the result of which leaves no doubt in our minds that a solution of the colouring matter of turmeric should find a place in every photographic laboratory.

A convenient solution may be readily prepared as follows:—Four ounces of well-dried turmeric *(radix curcumæ)*, which may be obtained from any chemist, is to be well bruised, or reduced to coarse powder, and moistened with alcohol. After standing for an hour or two the damp mass is packed into a percolator—a lamp chimney with a piece of muslin tied over the smaller end answering well—and some more alcohol poured over it. If the packing has been properly done the spirit last added will displace that which had been absorbed by the turmeric, and cause it to flow through the muslin at the rate of two or three drops per second. When the operation is fairly started sufficient spirit should be added to give a bulk of four ounces of percolate, which will be a very strong solution of curcumin, capable of giving a fine yellow colour to collodion, varnish, or any alcoholic solution.

A drachm of this solution added to an ounce of plain collodion and poured over a plate of glass gives a yellow film of great beauty, which, although it hardly seems to stop out any material quantity of white light, is so non-actinic that, when used in the window of the dark room, plates of the most sensitive description may be manipulated with perfect freedom from fog. The cause of this is quite evident from a slight spectroscopic examination, which shows that the violet is altogher absorbed, the green and red alone being transmitted. We know that some emulsion makers prefer a red or, rather, ruby light in their dark rooms. This can very readily be got with the turmeric, it being only necessary to add to the collodion a few grains of boracic acid, which, when the film is dry, and especially if heated, destroys its power of transmitting the green, giving a pure red light.

It is well known that the colour of turmeric, in common with many other vegetable colouring matters, is gradually decomposed by light, but our experiments would seem to show that when enveloped in the collodion film, or when mixed with ordinary photographic varnish, it is much more durable than when in contact with the starch and other *matériel* of the turmeric root; and, even should it be found unsuitable for permanent use, it will assuredly be valuable as a temporary expedient.

But an alcoholic solution of curcumin is of more use than merely to exclude the actinic ray from the dark room; it is one of the best organifiers for a washed emulsion pellicle that we have yet tried. We added it to the extent of ten drops to the ounce of emulsion just previous to pouring into the dish; and, as the curcumin is very sparingly soluble in water, it is not removed by the necessary washing, and gives to the redissolved pellicle a fine yellow colour, which altogether prevents the necessity for backing of any kind.

We may add that we experienced some difficulty at first in removing the yellow appearance from the developed plates, but ultimately it yielded readily to a wash with methylated spirit. Our experiments have not been sufficiently extended to warrant any very strong statement as to the superiority of curcumin over other organifiers; but, from what we have seen, we believe that it will be found in every way a most important addition to the *matériel* of the emulsion worker.

RECENTLY PATENTED INVENTIONS.

No. I.—MICROMEGAS.

By the above designation we are introduced to certain inventions by M. Jules Henry Hermagis, optician, Paris, to which reference has already been made in this Journal, and of which we are now in a position to give full details, owing to the publication of the specification of the patent. The invention received provisional protection only; but it illustrates in a forcible manner what we have all along said was a blot upon our patent system, namely, that patents may be obtained in this country for anything, no matter how old or impracticable it may be. In the present instance the inventions—for there are in reality three, each being entirely different from the other—for which protection was sought are certainly not impracticable, for all have been actively employed at one time or another by photographers, and they have only ceased to be so employed because they have been superseded by superior methods.

The object M. Hermagis had in view is highly praiseworthy, consisting, as it did, in the production of "a simple, effective, and portable apparatus, equally available for photographic operations within doors and in the open air, as well as for making enlargements." The first division of the invention is described as follows:—

"My first improvement has reference to the camera itself, and consists in forming the two sides, the top, and the bottom of four pieces of wood jointed together by hinges, which exclude the light and extend the entire length of such pieces, the points of junction of each piece being also bevelled to an angle of forty-five degrees. Such camera can thus be easily folded flat for transportation or for otherwise economising space, and, when required for use, on being unfolded the hinges with the bevelled edges cause it to assume the shape of a rigid square, which is further maintained by the insertion of the lens board in front, and of the dark slide at the back."

On this we have merely to remark that at page 25 of our Almanac for 1874 is a drawing of the first folding or portable camera ever made, the drawing and description applying with much exactness to the Hermagis camera; and of such cameras as that to which reference is here made we remarked that "they are frequently to be met, but so completely have they been cast into the shade by those with bellows bodies that no manufacturer now ever makes them unless to order."

The second improvement has reference to the tripod, the means of attaching the camera to the same, and to the method of imparting solidity and rigidity to the parts when mounted for use. We allow the inventor to describe it:—

"My tripod consists in the usual three legs, shaped so that when not in use they form a complete circle on being closed together; but instead of as hitherto making the head an independent part of the tripod, my head is a fixture on the top of the legs, and consists in a metallic disc, the diameter of which does not exceed the diameter of the upper part of the three legs, provided underneath with three horizontal pins and vertical wings to which the legs are jointed, and pierced with a central hole for the purpose of attaching the camera to the same by means of a screw with a large knob inserted from the inside of the camera. With a view of imparting rapidity I pierce the screw, as well as the metallic top of the tripod, with a small central hole through which I pass a wire or twine, and suspend thereto a weight composed of any material at hand, such as stones, earth, water, &c., bringing the same down as near to the soil as is convenient. When the camera is dismounted the screw is replaced in the disc of the tripod and serves as the knob of a walking-stick."

Passing altogether over the fact that the majority of *portable* camera-stands were at one time constructed so as to fold up into the form of a round stick, we may observe that the description just given applies to some of the "walking-stick tripods" that are being occasionally manufactured at the present time. The chief objection we urge against them is the great want of height, for few practical photographers would ever think for a moment of taking a view from a point of sight of the low altitude permissible by the elevation of a walking-stick, unless it were that of one of the "sons of Anak," and even then a circular "alpenstock tripod" is a piece of apparatus very well known to manufacturers both at home and abroad. A similar stand, by Geymet and Alker, formed the subject of special comment in these pages several years back. The only circular stand we have yet seen or heard of fulfilling in any way the requisite conditions of suitable shortness when packed, with appropriate height when opened out, is that which was introduced a few years since by Mr. Price; but that is very far from being a stand of the walking-stick order, for

it forms a mass so compact, stout, and specifically heavy when packed up as to be suggestive of its adaptibility for felling any furious animal which might chance to come in the way of its possessor. A thoroughly portable walking-stick tripod capable of distention to the extent of about five feet is a desideratum; and we need scarcely add that rigidity when distended is an essential condition in such tripods. This brings us to M. Hermagis' method of imparting rigidity to his stand, namely, the suspending of a weight by means of a string attached to the screw in the centre of the head of the stand. This method is really excellent, we have adopted it frequently. We trust that M. Hermagis will not consider us as showing any discourtesy as regards his inventive powers if we state that, in the course of an article entitled *How to Photograph in a Gale*, published precisely nine and a-half years ago all but a month, we described this method *very fully*, coupling with our remarks the well-known names of those by whom it was practised and recommended—Major Russell and Mr. A. Burns. *Litĕra scripta manet.*

The last item in the three-fold invention of M. Hermagis is thus described :—

"My third improvement has reference to the manner of mounting the lens, and consists in making the outside of the lens tube in the shape of a swift screw, and providing the inner surface of the usual ring or washer with a similar thread, so that for the purpose of focussing it is sufficient to rotate the lens in one or other direction. The tube usually attached to the ring or washer can thus be dispensed with. A much larger range of focus is thus obtained, which is particularly useful in enlarging. For this latter purpose I fix the negative in the ground-glass slide and expose it to light, excluding at the same time the passage of light or actinic rays around the negative; and then, after placing the screen to receive the enlargement at the required distance from the lens, I adjust the position of the latter by the means above mentioned until the requisite sharpness is obtained."

A very brief period has elapsed since a contributor to this Journal* directed attention to the fact of this method of focussing having been well known in this country certainly over twelve years ago. Although its want of novelty would have militated against a patent being sustained had M. Hermagis carried on his invention to the final stage, the method is so excellent that we think it matter for regret that it has been allowed to fall into desuetude. For rigid or sliding-body cameras, as distinguished from those having a rack-and-pinion movement, no kind of adjustment equals the screw as respects nicety or accuracy. The fittings are singularly neat, and there are no projections or screws which might become loose and be lost.

It will be seen from what we have said that, while fully recognising the excellence of the various inventions patented, or, rather, sought to be patented, by M. Hermagis, we are quite at variance with him as to the points of novelty involved in them; and unless the invention for which protection is sought be *new*, any patent granted for it will assuredly break down when such points have to be verified before a legal tribunal.

The subject of photometers has of recent years attracted a great deal of public attention, and many instruments of different descriptions have been introduced. This has been the result of the rapid strides which carbon printing has made in public favour, and nearly the whole of the instruments hitherto introduced have been intended for the special purpose named. But another and equally important application of the photometer exists, and appears to have been almost wholly neglected. We refer to the measurement of the exposure necessary in the camera. It must be obvious that the shortness of the exposure in the latter case renders necessary a much more accurate measurement if the result is to be of any value; hence it is, perhaps, that so few attempts have been made to solve the problem—indeed it has been stated to be impossible to form an actinometer capable of rendering even approximate service for negative work. Several years ago a proposal was submitted to the public, through our columns, which attempted to deal with this question. The idea consisted in the formation of a triangular trough of glass, which was to be filled with a blue solution of a suitable depth of tint. By placing this trough between the eye and an illuminated object in the landscape to be reproduced it was hoped that the comparative value of the illumination might be calculated from the thickness of the layer of solution required to absorb the whole of the rays. A few weeks since a modification of this idea by M. Henry Hermagis, of Paris, was described by our Paris correspondent, Professor Stebbing. This consists of a small wedge-shaped piece of yellow glass, graduated according to its thickness, and is to be used in the same manner as the trough just described. But such means are not to be relied upon to give accurate results, owing to the deceptive character of the luminous rays. In another column will be found a brief summary of the remarks of M. Leon Vidal upon this subject. M. Vidal has introduced a photometer for negative purposes, of which, however, he has not published a description, so that we are unable to speak as to its efficacy; but, from his treatment of the question, we have no doubt that he has succeeded in constructing an instrument of practical utility.

* The "Peripatetic Photographer"—*ante*, page 6.

JOTTINGS FROM MY NOTE-BOOK.

No. V.—The Carbon Process.

It seldom happens that, in any of the divisions the work of man may be classed under, progress is made in an uniform manner. It seems to the observer as though the stream sometimes is dammed, when something slight in itself makes a breach, and away rushes the pent-up waters with a mad impetuousity for a time, yet eventually settling down to the ordinary rate of travel. Such a phenomenon in reference to carbon printing took place in the years 1874 and 1875.

The events of the latter year are too fresh in the memories of the readers of this Journal to require any comment; hence I will deal only with the former. The first name on that year's list is that of Fargier. The process he detailed is an interesting one, and shows that he is a thorough master of the chemistry of the changes involved in carbon printing. It is based upon the reduction of the perchloride to the protochloride of iron by the agency of light. This lower chloride, in its turn, will reduce chromium trioxide; while this lower oxide of chromium renders gelatine insoluble—a circumstance upon which carbon printing is built. The process is said to contain many difficulties.

I now come to the improvement made by M. Lambert. To prevent any misconception that might otherwise take place, allow me to draw attention to the fact that there is a distinction between the legal and practical bearing of a subject, and it does not necessarily follow that if a thing be legally invalid it is practically unsound. The practicability of M. Lambert's processes cannot be gainsaid; they will certainly give an impetus to carbon printing, and also, I hope, to the entire abandonment of the method in which silver is employed. It only falls within my present province to treat of one of the processes, and that is termed in the specification "Improvements in Producing Carbon Photographs." The information which M. Lambert gives to his licensees is certainly far beyond that which he claims or gives in his specification; and he must be an extraordinarily slow pupil who can fail under the tuition of so thorough a master. As respects the claims made in the specification it will be as well to learn what they are, as in my peregrinations I find a great deal of misconception existing in connection with them, and a clear understanding is very desirable. These claims are as follow (I quote from the specification):—"1st. The intensifying or strengthening bath composed as herein specified for obtaining *clichés* as set forth. 2nd. The method of obtaining the bordered support or ground in any desired tints or subjects on which the carbon picture is to be produced as specified." If now the composition of the intensifying bath and the method of obtaining the bordered support be given (as specified) all who can read will have the means of deciding the points claimed for themselves. The bath is specified as follows:—"The gradual strengthening which I apply to the salts of chromium consists of a solution of 300 grammes of water, one drop of liquid ammonia, and one gramme of ordinary sugar of commerce; in addition to which, according to the desired intensity of the negative, I add a few drops of a saturated solution of permanganate of potash." Such is the bath claimed in the specification. The method for obtaining the grounds is stated as follows:—"I also claim obtaining prints in salts of chromium on ordinary albumenised papers, with borders, in a scale of different tints which contrast with that of the picture. For this purpose I take ordinary

albnmenised paper of any quality and expose it to light after sensitising, then place it in the press, taking care to preserve a blank for the picture with a black or yellow mask; and in this manner I obtain an impression from a negative of any ornamental border with a blank space reserved for the picture. I then precipitate with hyposulphite, and fix as in ordinary, and, if desired, apply it to the oval or square photograph. By this means I obtain on the same sheet two tints which harmonise perfectly—one for the picture and the other for the border. If, however, it be not desired to have recourse to this photographic process I may lithograph on fine paper of varied or graduated tint any desired impression, such as a plain or ornamental ground, an oval or round-cornered blank being left for the picture as before." All the errors in this extract exist in the specification, or, rather, in the printed copy I have in my possession.

The last improvement published in 1874 was comprised in a patent granted to Mr. J. R. Sawyer for "Improvements in the Production of Photographic Prints." He claimed and described the method of making a flexible temporary support, the distinctive features of which he gives as follows:—"The combination of insoluble gelatine, as described, with lac and its analogues, to form a bed or couch in which the detail of the picture is held whilst in a moist condition and during the process of development."

With this my goal is reached and the work of 1874 outlined. Whatever may exist in the future is beyond man's ken; still we can hope, and not without reason, that in the immediate future the fading of photographs may be obviated, and thus one more stain will be rubbed off the escutcheon of photography.

W. E. Batho.

ORGANIC SALTS OF SILVER.

As you allude in your leader of last week to the use of organic salts of silver, may I have space to say that the conclusion of a prolonged series of experiments have shown me that the lactate, suggested by Mr. Cooper, is a preferable addition to a bromide emulsion to the malate? In some cases, indeed, the lactate is of great value.

I have had to make this investigation into the numerous salts very prolonged, as, though sensitivenss and quality of negative may be good things, yet, for dry-plate work, it is desirable to thoroughly test keeping qualities both before exposure and between exposure and development; and I do not consider two years more than sufficient for this.

One risks in this someone stepping in before one's series of experiments are concluded. This happened to me with iodide in emulsions, and might have happened with gelatine pyroxyline. In the latter case I had communicated on the subject with Mr. R. M. Gordon, Canon Beechey, Mr. Gough, and others, and made no secret of the work I was doing; and now that the success of the novelty is proved I hope it will be adopted. I am just coming to the end of my gelatine emulsion experiments, which I hope to publish in time for this year's work.

H. Stuart Wortley.

NOTES ON PASSING EVENTS.

By a Peripatetic Photographer.

When reading the account of the portable spirit level for the camera devised by the Editors on the basis of the plumbers' level, it occurred to me that one which I have adopted is still simpler and, at the same time, not less efficient than either the plumbers' level or the pocket vertical level. It consists of ten inches of thread with a leaden plummet, the size of a pea. at one end. When this is held up against the ground glass it shows at once whether or not it is in a vertical position. This plumb line and plummet possess another feature of value: when hooked upon the screw of the camera stand it dangles below like a pendulum, the oscillations marking half seconds with great precision. If seconds be wanted instead of half seconds the string must be forty inches in length. This saves the necessity for looking at a watch when giving short exposures.

If I were the Editor of The British Journal Photographic Almanac I would accept as a compliment a bit of criticism on that annual work which was probably intended by the editor of *Nature* as anything but a compliment. He is, evidently, of opinion that it should consist of a dry disquisition on the scientific aspect of the art, instead of being so much devoted to the details of everyday, living, practical photography. When it speaks of photographic annuals failing in recording progress the old proverb, *ne sutor ultra crepidam*, is irresistibly forced upon one's attention. A pretty, precious, and well-appreciated Almanac it would be were its contents limited to luminous vibrations and spectroscopic examinations of coloured films. From such an Almanac Phœbus protect us! By the way, what *is* "science?" I used to think that the term was employed to signify systematised knowledge; but as the critic of *Nature* evidently pooh-poohs such commonplace subjects as baths, lighting, and printing as something quite antithetical to science, I imagine that the word may be undergoing some change in its signification.

The experiments described by Captain Waterhouse at the last meeting of the London Photographic Society concerning the action of eosin on the photographic spectrum are interesting, although as yet nothing of a practical nature has been deduced from them. If the good time should ever come when, by the addition of colouring matter to the collodion films, such films are rendered more sensitive to certain coloured rays, much credit will be due to Dr. Vogel for having initiated the doctrine, and for being such a persistent experimentalist himself and inducing others to embark in the same course of experiment.

The advocacy of the establishment of a photographic academy in Germany prompts me to inquire how it comes to pass that such an academy cannot be established in London. It should prove a good commercial speculation. There are numerous persons, of both sexes, both in London and the provinces who are anxious to acquire a practical knowledge of photography in all its various ramifications, and yet there is no place where such tuition is imparted. Suppose, for example, that there was an evening class for instruction in the retouching of negatives, in the working-up of enlargements or other pictures in monochrome, in the production and painting of transparencies, in the preparation and development of the various kinds of dry plates, and so forth—just think what a success it would prove! And if similar classes were held during the day for tuition in such processes as demanded daylight—such as carbon and silver printing, the wet collodion process, including lighting and posing the sitter, with an occasional "field day," say once a week, for landscape practice—I venture to say that the number of applicants for instruction would be sufficiently great to absorb the entire attention of a large staff of tutors. If a few enterprising capitalists were to start such an academy, and conduct it on sound principles combined with liberal terms, it would yield such a return for the expenditure as would be surprising even in these days of skating rinks, which yield cent. per cent. and an overplus of profit besides.

Is a posing chair an "accessory?" I see that it is thus designated in a recent editorial notice of the photographic furniture department of Messrs. Taylor Brothers' factory. A posing chair is what I shall venture to term a "luxurious necessity." If one *must* sit, then a chair, I imagine, is really necessary; comfort in sitting is suggestive of padding in the upholstery; and, equally so, posing implies a certain kind of configuration, wooing the sitter to an easy and graceful position without his or her being aware of it. Posing chairs, with their graceful curves and comfortable reclinature (pardon the word—I force it into the service) are, therefore, not "accessories," but *necessaries*. Q. E. D.

(To be continued.)

THE ACTION OF PRESERVATIVES UPON BROMISED SILVER PLATES.*

It is well known that certain substances—such as morphia, tannin, gallic acid, yellow alkaline salts, and lunar caustic—greatly increase the sensitiveness of iodide of silver. Of all these sensitisers lunar caustic is the most powerful, as was demonstrated by me some ten years ago. Now it seems very likely that these substances should exert a similarly-favourable effect upon bromide of silver. But the result of some experiments, published by Mr. M. Carey Lea, in 1874, appeared to leave this favourable action doubtful. He experimented with coatings of xyloidine, glycerine, resin, and tannin, and found that the last-named substance *lessened* the sensitiveness, and that the others produced no effect. In the course of last year I undertook a series of experiments with dry plates, which afforded me an opportunity of testing the action of other sensitisers upon bromide of silver.

I began with morphia, which makes both iodide of silver and bromo-iodide of silver much more sensitive. Singularly enough, with bromide of silver alone it showed no such action; indeed, the morphia plates appeared even somewhat less sensitive than those simply bromised. A coating of pyrogallic acid upon bromide of silver gave a similar result. When fresh there was nothing noticeable about it, while it greatly increased the sensibility of iodide of silver; and, as

*Mittheilungen.

in addition to pyrogallic acid, gallic acid, india-rubber, and albumen are used as coatings for bromised plates, it was interesting to test the action of these substances too, which I did, and obtained the following results:—Gallic acid, in a solution of one in one hundred, poured over the plate and allowed to dry, lessened the sensitiveness of the bromide of silver very perceptibly. India-rubber, employed as a solution of 1:50, gave the same result. In both cases, however, the plates treated with the solutions were clearer and cleaner than the uncoated ones. Albumen I tried like Fothergill, namely:—

(*a*) Albumen .... 25 cubic centimetres,
Water .... 14 „
Ammonia .... 5 drops,

shaken and filtered. (*b*) 100 cubic centimetres of water, in which six grammes of silver were dissolved, were diluted with ammonia until solution (*a*) no longer gave any deposit; then twenty cubic centimetres of the solution (*a*) and twenty-five drops of solution (*b*) were diluted, and the whole was poured over the bromised silver plate and allowed to dry. The result was that the albumenised plates were less sensitive than the simply bromised-plates. On comparing wet nitrate of silver in the following way, namely, one half of a plate being covered with it and the other half left untouched, it was found that the covered end was considerably more sensitive than the uncovered. Further, after being coated with the solution of albumen the plates were washed and dried, and then the albumenised plates were more sensitive than the unalbumenised.

Bromide of potassium, one part dissolved in 100, was allowed to act for five minutes upon some plates, which were then washed and dried. These plates were much less sensitive than those not treated with bromide of potassium; yet the effect of the bromide of potassium upon the bromised silver plates was far from being so detrimental as that of iodide of potassium upon iodised silver plates. Lastly: a solution of tannin, in the proportion of 1:50, was tried as a coating. Here also the tannin-bromised plates were much less sensitive than the simply-bromised plates, yet the former were cleaner.

The difficulty with which the tannin plates were fixed was very striking. While simply-bromised silver plates were almost instantaneously dissolved in a concentrated solution of hyposulphite of soda, the tanninised plates required to be treated with it for about a quarter of an hour before all the bromide of silver was dissolved. This effect was the more surprising as the plates had been washed first with alcohol and then with water before being developed. This circumstance suggested to me that perhaps the reason of the tannin having such an unfavourable effect is that it hinders the chemicals from penetrating the film.

On this supposition I tried removing the tannin completely before developing, by washing the plates repeatedly with alcohol. These were compared with simply-bromised plates exposed along with them and similarly treated; then they were both developed together. In this case the tanninised plates had a much greater intensity in the high lights than the simply-bromised plates, and yielded their bromide of silver, on being treated with hyposulphite of soda, quite as readily as the latter.

This experiment throws a light upon many phenomena, as until now it has been very generally understood that preservatives had also the task, in the case of dry plates, of keeping the film less cohesive and of facilitating the penetration of the chemicals. However, tannin, one of the principal preservatives, when applied to bromised silver plates shows the very opposite of these pleasing properties. The experiment, however, shows farther that the apparent lessening of the sensitiveness of the tannin-bromised plates is only owing to the circumstance that the tannin obstructs to a considerable degree the developer from penetrating the film. In all these experiments, without exception, I used an alkaline developer.

Tannin only accelerates the exposure. How far this obstruction of the development occurs with other preservatives remains to be learnt by further experiments. Apparently it plays an important *rôle* in bromised silver plates. H. Vogel, Ph.D.

PRINTING DEPARTMENT.

Having prepared and dried the paper, checked the prints, and replaced them in the washer, we now turn our attention to the filling of the frames.

The work-room should be of suitable dimensions, and free from lumber, with a bench for filling the frames in a corner, screened from the too strong rays of the light. The floor should be covered with waxed cloth and be washed out at least once a week. Dust in the printing-room is an abomination; for it flies about, settles on the paper and negatives, causing spots and a great deal of extra trouble to the toucher-out. The dense negatives, or those first required, should be filled first, and put out in the sun, if requisite. In the summer time, when they print very quickly, one person should be kept exclusively filling the frames, while another watches them. A duster, made of muslin or some soft material, should also be used to keep the negatives clean.

Vignetting, to do it properly, is rather a tasty matter. Paper vignettes are, I believe, in general use; but the disadvantages arising from the paper getting torn, wet, and not producing a fine graduated tint, caused me to seek another method whereby good results could be obtained. Procure some stout cardboard—waste will do—and cut it into pieces the size of the frames, and then make the ovals to suit your requirements. A vignette should be of just sufficient size to take in a very little of the neck and shoulders, and come close over the head, because, when it is kept *well off* the glass and turned repeatedly, it will print down and up a good deal, giving a beautifully-shaded effect.

The best way to fasten the vignette on to the frame without paste or tacks is to purchase a few elastic bands and slip them over. There should be two for each frame—one at each end. A dozen or two of vignettes can be prepared beforehand ready for use, and all that has to be done is to pop on a cardboard oval, fasten it, and out with it to the light.

As the prints are unfilled they should be kept flat by means of a weight, for it is easier to cut them thus than when they are curling up. A good, large-bladed penknife is the best to cut them with. The only exception where the head is *not* cut in the middle of a *carte* is when a lady has a long train. It should be cut a little to the side to take in the dress, and in large heads taken in profile. But the eye is the only sure guide, and practice and experience the only way by which it can be taught.

Care should be taken when filling the frames to put the paper evenly on, and use only the best pieces for vignettes, as a mark or spot would render them useless, whereas it might not show in a plain one. Lindsay Howie.

HIGH POWERS IN MICROPHOTOGRAPHY.

[A communication to the Photographic Society of Philadelphia.]

Some time ago I exhibited to the Society the camera and apparatus designed by myself for the purpose of making enlarged photographs of microscopic objects, and, at the same time, explained it, so that it will not be necessary for me to do so again. My object in reading this paper to-night is to bring to your notice some facts which I have noticed in working with this apparatus.

I desired at some time to photograph blood discs of various animals, and, as they were of a very minute size, it required a power of at least five hundred diameters to show them satisfactorily. In order to get this amplification I extended my camera to its full length of ten feet, while I used an objective of one-fifth of an inch focal distance; but, although I used a powerful reflector and a very good condenser in order to obtain as much light as possible, the image on the ground glass, or, rather, I should say, the piece of plate glass, flowed with a thin pellicle emulsion and then dried, appeared very dark and misty, and by no means could I obtain a sharp outline of the discs. Nevertheless, I exposed a plate for five minutes and obtained a negative, of which I place a print before you. As you see, it is hardly possible to distinguish the outline, much less to measure it.

In thinking about this thing it occurred to me that the want of definition might be caused by the want of depth of the lens, as the blood corpuscles are not flat discs, but have a certain thickness and rounded edges, while they are depressed in the centre, thus having the shape of an ordinary water-cracker. A lens of no penetrating power will show, as you can easily understand, no outline if brought to bear upon such a body as the blood disc; for the real edge or boundary line of vision is considerably below the highest point of the surface, and so either one or the other will be out of focus, and, therefore, blurred. To remedy this defect in my lens I saw there was but one thing to be done, and that was to pass the image through an eyepiece—a combination of a bi-convex lens and a plano-convex one, separated from each other by a certain distance. I did introduce the eyepiece into my camera and obtained a much flatter field and much more definition, but so little light at the distance necessary for the desired amplification that I saw it would take at least ten minutes' exposure on a wet plate to get a negative. Such a length of time, of course, I could not expose, for the light would have failed entirely owing to the movement of the sun. I noticed, however, that at a short distance from the eyepiece I could obtain a small picture of great brilliancy and sharpness. When I saw this the idea struck

me that I might treat this brilliant small picture like a drawing to be enlarged by the photographic lens, and accordingly introduced a Dallmeyer rectilinear lens 4-4. This, when placed in the proper position, gave me on the ground glass an image of great sharpness and almost as much brilliancy as the small aerial picture which it was copying. Thus I obtained negatives in five seconds sufficiently strong to print and, what is better, of considerable sharpness. Of them I have two prints on the table, one showing birds' blood and the other the blood of the toad.

As the difference in size of the blood discs in most mammals, as compared with those of man, is very slight, and as it is of very great importance in legal cases for the expert to decide whether a given specimen is blood of man or of an animal, such as a sheep or a pig, I have endeavoured to show this difference so that it can be measured. In order to do this I place a micrometer in the eyepiece, which, when in the proper position, will give a sharp image on the negative; then, by placing two kinds of blood close together on a slide of glass, so that both are in the field at the same time, I am enabled to obtain an image of the discs and the micrometer, which, as you see in this print, shows a decided difference of size of the discs, and facilitates the labour of the expert to instruct a jury in legal cases. The fact that the micrometer and the blood discs are obtained on the same negative removes the objection which might be raised that the difference in diameter of the discs may be the result of a difference in the power used.

The reflector which I have been in the habit of employing in order to condense the light was silvered on the convex side, as all mirrors are. This, however, proved to be a disadvantage, as, according to the angle at which the light fell upon it, there resulted two or more foci, one from the silvered surface and the others from the surface of the glass. These different foci lying in different planes interfered with each other so as to make a "ghost," which proved a serious obstacle to definition and sharpness. I therefore tried to get a reflector with but one reflecting surface, and succeeded with the following formula for silvering:—

A.—Nitrate of silver	....	800 grains.
Distilled water	....	4 fluid ounces.
B.—Rochelle salt	....	540 grains.
Distilled water	....	6 fluid ounces.

Add liquor ammonia to the silver solution and form a precipitate, which must just be dissolved with more ammonia; then add a little more silver until a precipitation is formed which will not dissolve by stirring. To this add twice its bulk of the Rochelle salt solution, and dilute with twenty parts of water. Into this immerse the glass, perfectly cleaned, and leave it for several hours; then take it out, wash it with plenty of water, and dry by setting it edgewise on blotting-paper. When dry the silver deposit can be polished with cotton and fine rouge, and will give a very good reflector. I am continuing my experiments in this department, and hope to obtain still better results in future than hitherto; and if the members of the Society are interested I will be happy to bring to their notice anything new and interesting that may be developed.

C. Seiler, M.D.

FOREIGN NOTES AND NEWS.

The Sale of Poisons in Austria.—A New Element.—The Voigtlander Prizes.—Herr Fritz Luckhardt's Glass-House Roof.—The Prevention of Rents and Blisters in Negatives.—Self-Filtering Silver Bath.—M. Vidal on Exposure in Landscape Work.

The Austrian Chamber of Commerce has drawn up a list of the modifications they wish to have made in the present law for the regulation of the sale of poisons. The draft now awaits the decision of the Minister of the Interior; but we do not know whether the proposed alterations will meet the views of Austrian photographers.

It has usually been supposed that it was quite as likely that some one of the sixty-three substances presently considered elements should be found to be a compound as that a new element should be discovered. It seems, however, that recent spectral researches have resulted in the discovery of a new metallic element having great affinity for zinc. Its spectrum is two bright lines in the violet. Only a very small quantity of the new metal—which is to be called "gallium," in honour of France—has been obtained, and its properties are now being investigated by a committee of the French Academy of Sciences.

The following prizes are offered for competition, in the course of the present year, by the managers of the Voigtländer prize fund:—1. A gold medal, of the value of 140 ducats, for an increase in the sensitiveness of wet plates. 2. A gold medal, of the value of 140 ducats, for the demonstration of a dry process distinguished for sensitiveness and reliability. 3. A silver medal for a collection of studies from nature calculated to be useful as studies for artists. 4. A silver medal for a collection of instantaneous stereoscopic views. 5. A silver medal for a series of transparencies suitable for illustrating instructions in natural science, art, and technical subjects. Besides these the committee of judges offer gold, silver, and bronze medals for such inventions, improvements, and scientific treatises as shall be laid before the Vienna Photographic Society in the course of 1876, as well as for meritorious productions in every department of practical photography:—1. A gold medal, worth about 140 ducats, for the communication of a process for the production of plates in high, and bas-reliefs in half, tones by means of photography. 2. A gold medal, worth 140 ducats, for a critical study of the reactions of chromic acid and its salts upon albuminate, albuminoid, and carbonic hydrate, with reference to the various heliographic printing processes. 3. A silver medal for a collection of carbon prints produced in Austria or Hungary. 4. A silver medal for *genre* pictures. 5. A silver medal for a collection of views of old monuments. 6. A silver medal for a collection of ethnographic studies. 7. A silver medal for a collection of anthropological studies. The competition for the first series of prizes seems to be restricted to the members of the Vienna Photographic Society, while the second seems open to non-members.

Herr Fritz Luckhardt writes to the *Photographische Correspondenz* to recommend a new form of pane for the roofing of glass houses. He says:—"All photographers have had more or less experience of the annoyance of water dripping from the roof, especially in winter, when, in consequence of the variations of temperature and the coolness of the nights, the window panes are thickly covered with condensed moisture. As a remedy recourse is commonly had to cementing the panes anew and coating them with oil colour; but I have repeatedly found that this only aggravates the evil. The arrangement I find suitable differs from that employed until now, in that the wood work is not rectangular in form, but grooved, where the glass is fastened in, so that the drops of water which used to collect at the straight edge of the underlying pane, and fall off into the glass house, now run off by the grooves. For the roofs of new glass houses, most of which are drawn by iron rods, there could also be a small double gutter for allowing the water to run off, and allowing the pane of glass on the one side to be cemented in a little higher than that on the other side."

In an article in the same journal Herr Leopold Bachrich discourses on cracks and blisters in negatives, his attention having been called to the matter by a recent discussion at a meeting of the Vienna Photographic Society. He prefaces his remarks by reminding us that there were two distinct appearances under discussion—namely, the thin, long thready rents which divide the film of the negative without raising it from the plate, and the broader, snake-shaped places which rise from the plate, and which would require to be flattened down again to the glass to restore the negative. The cause of these appearances is generally understood to be exposure to cold and damp, and upon that assumption Herr Bachrich attributes the fact of the complete immunity which his negatives enjoy from the deteriorating effects of cold and damp to the use of two precautions. He does not leave his newly-varnished plates to dry of themselves, but keeps them in motion above a spirit lamp until they are perfectly dry, by which time they contain much less latent moisture than if they were left to dry of themselves, as, in the latter case, the outer surface of the varnish hardens first, and a considerable quantity of moisture is retained in the under-layer of the varnish film. The second precaution was a solution of india-rubber poured as a preservative over the collodion film while still wet. He was induced to adopt this plan by an accident which once befel him. As the collodion film on some plates that had already been used several times began to dry the film rose completely off the plate and the picture was destroyed. The next time the same thing threatened to happen he poured over the plate a thin solution of rubber, by which the calamity was averted, and he has never since dispensed with the rubber coating. So much for the prevention of these pests; now for their cure. Herr Bachrich has generally found that the first-mentioned class of blemishes, viz., the thready rents, can be mended by rubbing them down with the finger and breathing upon them to induce the edges to unite; and the snake-shaped blisters can generally be removed far enough to make the negative useful by re-varnishing with a thin varnish, and, when that has quite hardened, pressing in a printing-frame. Lastly: he thinks large plates much

more subject to such blemishes than small ones, because, owing to their larger surface, the film both of collodion and varnish is thicker, and, consequently, contains more latent moisture than the thinner films of small plates.

Herr Thiel describes a self-filtering silver bath, or, rather, a silver-bath dish combined with a filter, which he saw at a friend's. The dish is a common bath with a lid. Under the lid an upright strip of glass, a quarter of an inch lower than the side of the dish, is placed; there are several holes in the strip of glass, and behind the glass a strip of felt. When the silver bath requires to be filtered the dish is tilted, so that the whole contents run into the lid and so behind the filtering felt; from thence it filters back to the bath in the course of a few minutes.

M. Leon Vidal has just published a second revised edition of his work, entitled *Calcual des Temps de Pose*, and in an article in the *Moniteur*, speaking of the difficulties attending dry-plate work in the field, more especially with regard to securing the correct exposure, divides the subject into six heads, each of which necessitates a separate calculation. The divisions are—1st, the intensity of the light; 2nd, the exact size of the diaphragm; 3rd, the focal length of the lens; 4th, the normal sensitiveness of the plates; 5th, the reflective power of the objects to be reproduced; 6th, the nature of the illumination, whether sunshine or diffused light. The writer goes on to remark that when the focus, diaphragm, and sensitiveness remain unchanged, it is easy with a little practice to attain approximately the required exposure, but where these circumstances are continually changing it is difficult if not impossible to succeed, without recourse to some reliable method of automatic measurement of the light. The difficulty is, as M. Vidal points out, materially increased when interiors or dimly-lighted views are to be reproduced, or when the evening sun is shining.

THE LARGEST PHOTOGRAPHS IN THE WORLD.

The Australian mail brings, *inter alia*, the Sydney *Evening News* of a recent date, from which we extract an article under the above heading that speaks highly for the skill and enterprise displayed by our antipodean brethren.

Mr. B. O. Holtermann, the well-known gold miner, and one of the richest men in the colony, claims to have produced the largest photographic views in the world. This is, of course, saying a great deal. Our Yankee friends, who are proverbial for big things, may possibly be inclined to dispute Australia's claims to photographic superiority; and one can even fancy he sees a smile of incredulity lighting up the face of brother Jonathan when such an announcement as the above reaches his ears. But let us see how far Mr. Holtermann's claim is justified by facts.

After having made his fortune at gold-mining, Mr. Holtermann, at the instance of the late Mr. Beaufoy Merlin, whom he engaged as private photographer, started to take photographic views of the principal parts of New South Wales and Victoria, with the idea of one day making a tour of Europe, and exhibiting a grand panorama of the Australian colonies, especially New South Wales, as a field for emigration. The idea is a philanthropic as well as a patriotic one, and does credit to the heart and head of the lucky digger. To carry out the idea successfully, however, Mr. Holtermann came to the conclusion that no half measures would do. It must, he argued, be done on a grand scale, or not at all; and with the fixed determination of making his show the largest and most complete in the world he set about his work in real earnest, and spared neither time nor expense in the fulfilment of his grand idea.

Having a keen appreciation for the beautiful in nature he fixed on the magnificent harbour and scenery of Port Jackson as the centre of his labours. He purchased a site of land at the North Shore (Blue's Point, the highest point in the locality), from whence he could command an uninterrupted view of the city and harbour of Sydney. Here he built at enormous cost a residence fit for a nobleman, and one which, though its approaches and surroundings are not yet in a finished state, is an architectural ornament to the locality in which it is situated. On the summit of the building is a tower ninety feet high, from whence the views are taken; and perhaps from no other spot in the colony can such a magnificent view be obtained as from this elevation. For miles around the eye rests upon one splendid panorama of natural and artificial scenery, not to be exceeded for beauty by any place in the world. Here was an immense advantage possessed by Mr. Holtermann, and he was not slow in turning it to good account. The most perfect instruments that money could obtain were placed at the disposal of his staff of artists (for Mr. Holtermann employs a regular staff of photographers, and is himself an amateur photographer of considerable experience). Unfortunately, the sudden death of Mr. Beaufoy Merlin interfered for a time with Mr. Holtermann's plans, but an efficient successor was found in the person of Mr. C. Bayliss, under whose direction the great views of which Mr. Holtermann is now so proud have been produced.

He has two views of Sydney and harbour each five feet by three feet two inches, and two of four feet six inches by three feet two inches. These photographs, Mr. Holtermann claims, are the largest ever produced from single negatives. They give a complete view of the city and harbour of Sydney from Garden Island to Long Nose. No. 1 negative, which is five feet by three feet two inches, takes in the space from Garden Island to Dawes' Point; the second, of the same size, embraces from Dawes' Point to Miller's Point; the two others, each four feet six inches, showing from Miller's Point to Long Nose. Apart from the size of the pictures, they are splendid specimens of the photographer's art, the outlines being sharp and clear and the various objects shown coming out prominently before the eye. The difficulty of producing pictures of such size can be best understood and appreciated by photographers, among many of whom, we understand, it is believed that it is not possible to execute photographs of such magnitude. If such a belief exist Mr. Holtermann claims to have dispelled it, and to have worked a revolution in the art of photography.

In addition to these, Mr. Holtermann has had executed a panoramic view of Sydney and the harbour, thirty-three feet in length. This embraces a distance of about six miles in length, and the whole of the perspective is shown much clearer than can be seen by the naked eye. Signboards between two and three miles off can be seen easily without the aid of a glass. Messrs. Goodlet and Smith's Victoria Saw and Joinery Mill's signboard can be read on both picture and negative without any difficulty, while the comparatively small sign "Moore's Book Mart," in George-street, near the Town Hall, could be distinctly seen with the naked eye. There is but one defect in the picture, and that is one that cannot well be avoided, namely, the obscure and slightly-"smudged" look of the shipping in the harbour. The motion of the craft upon the water renders this defect unavoidable.

These views are the principal ones; but Mr. Holtermann's studio is stocked with thousands of photographic views, all splendid works of art, of different parts of New South Wales and Victoria. It is his intention to start for England early next year with his grand panorama of Australia, his principal object being to induce emigrants to come to Australia; and, as the expense he has already incurred is something enormous, Mr. Holtermann considers that Government aid should be given to a project designed solely to advance the interest of the colony.

Meetings of Societies.

LIVERPOOL AMATEUR PHOTOGRAPHIC ASSOCIATION.

The monthly meeting of this Association was held on Tuesday evening, the 25th ult., at the Free Library, William Brown-street,—the Rev. J. D. Riley in the chair.

The minutes of the previous meeting were read and passed, and the newly-elected President, Mr. Wm. Atkins, then entered on the duties of his office.

Mr. George Atkin was elected a member of the Association.

The President, after thanking the members for electing him, then proceeded to read his address, in which he pointed out the various ways the members could advance the art of photography during the coming season. He further advised more practical demonstrations at the evening meetings, and suggested several means and aids by which such demonstrations might be conducted, which would, no doubt, increase the interest of the meetings. He also pointed out the steps which had been taken by some of the members and others in producing, and the advantages which would be derived from having, a reliable actinometer, by which they could with certainty tell the strength of the light in exposing their dry plates.

Mr. Phipps said he thought that an actinometer would prove useless in cases where the camera was in the shade taking a brilliantly-lighted object or some heavily-shadowed foliage.

The Rev. H. J. Palmer gave an account of a visit he had paid to Edinburgh and the kind reception he had met with from the Edinburgh Photographic Society. He exhibited a spirit lamp, called the "Rechaud" lamp, which he found admirably suited for the purpose of creating a current of air in the drying-box which he used in preparing gelatine plates.

Some fine cloud and instantaneous views from gelatine plates were presented by Mr. Kennett for the Society's album.

Mr. Ellerbeck exhibited a number of carbon stereoscopic transparencies, and also a number of skeleton leaves placed between glass, which made capital specimens for exhibiting in the lantern.

The President then showed some specimens of portraits printed in Woodburytype, and a rubber roller for use in mounting large prints.

A hearty vote of thanks was passed to the *Association Belge de Photographie* for their kindness in presenting the *Bulletin* to the Association.

The members then devoted themselves to the examination of the fine collection of photographs which Mr. O. R. Green had obtained in Italy and Egypt during his *Run for Sunshine*.

The meeting was then adjourned.

Correspondence.

THE COMPARATIVE AFFINITY OF THE HALOGENS FOR SILVER.

To the Editors.

Gentlemen,—It appears from your article that you have misunderstood to some extent the meaning, or rather the object, of my letter published at page 23 of the present volume. It was my intention to have affixed a note to that letter, to the effect that it would be seen that I had taken no particular view in the matter. As I fancied it might elicit some remarks from you and others, I wrote the letter in question in a manner, as I thought, most likely to effect the object I had in view. This will account for the somewhat ambiguous wording of the same.

In the first place, it was not my wish to "place chlorine in the intermediate position;" I merely intended to show that Mr. Newton's dictum—"silver unites with bromine with much less vigour than with chlorine or iodine"—apparently involves the theory that chlorine has a greater affinity for silver than bromine. For my part I have more faith in the late Mr. Sutton's opinion, having experienced great difficulty in getting anything like an opaque film of chloride of silver even in an eighty-grain bath, which latter would convert a bromised plate in a few minutes.

You quote an experiment of Mr. Sutton's to the effect that bromine will displace chlorine from chloride of silver, and I have stated the converse of this. I would ask—How do you explain the action of chloride of copper on bromide of silver whereby *chloride of silver* is formed? It is well known that chlorine has a strong affinity for copper, and if bromine has not a greater, it would appear that the chlorine left the copper (its "*old* love") and united with the silver (its "*new* love"). This seems to support Mr. Newton's view, seeing, as I suppose, that the chlorine left the copper of its own free will—not forced out by the bromine.

You ask whether I am satisfied that the bromide of silver is more sensitive than the chloride of silver. In reply I would say—Refer to my paper published in your Almanac for 1875, and you will see that I have used such a developer as would be employed with bromide plates—in fact, *stronger* than many make use of. In that paper I stated my conviction that chloride of silver is less sensitive under the alkaline developer than the bromide, suggesting at the same time that the cause might be indifference of the chloride to the less refrangible rays (here, perhaps, some of the numerous colouring matters might come in).

I have, during the past week, somewhat modified my ideas* as to the sensitiveness of the chloride of silver, of which I will write later on.

The fifth paragraph of my letter is, as you say, an anomaly; and naturally so, seeing that I am fighting for two opposite causes in the same breath. "Not a very scientific method of writing on a scientific matter," you will say; but then you must remember that I am more of a herald than a belligerent, and I am therefore bound to be impartial.

You write at the top of the 26th page that my "explanation is based upon the supposition of Mr. Newton's, 'that a greater chloride unites with the silver much more vigorously than a bromide,' thus taking up with greater rapidity any free silver which may be present." This, as I said, is Mr. Newton's opinion, but I do not now feel much inclined to uphold the theory involved in that statement, knowing that, if two emulsions are made with the same quantity of nitrate of silver and equivalent proportions of the haloid salts, the chloride is formed more slowly than the bromide of silver. This, perhaps, is the best proof that bromine has the greater affinity, seeing that the two different halogens may be combined with the same base (say, ammonium), so that on one side the relations may be identical, thus leaving no disturbing influence to force the bromine or chlorine from the ammonium.

I think, perhaps, that I ought to express my opinion—taking all the evidence and adding it to my experience—that chloride of silver does *not* conduce, *per se*, to *clearness* in the negative—perhaps rather the reverse; but that a soluble haloid in excess does, or hydrochloric acid, the latter by setting free nitric acid, as stated by yourselves.

I now wish to tackle the last paragraph but one of your article. You say that the difference in the behaviour of chloride of silver in emulsions of collodion and gelatine "cannot be brought fairly into any argument referring simply to the sensitive medium itself." I merely mentioned gelatine by way of parenthesis; but I do not see any necessity for its use being unfair in any experiments which may be made, seeing that all soluble haloids may be washed out of the emulsion previous to exposure.

My theory is that the gelatine restrains the development in some way. This will be at once perceived if two emulsions be made—one with gelatine and the other with collodion—and all free haloids (in this case a chloride) washed out, or a definite quantity added to each. The gelatine will give a clean and dense negative, and the collodion an equally foggy and thin one. As I mentioned in the Almanac for 1875, it is possible that an exceptionally organic pyroxyline might prove more favourable.

You go on to say that "it is now a recognised fact that a gelatino-bromide emulsion far excels a collodion-bromide; why, then, should a gelatino-chloride be so much slower under similar circumstances?" And so it doubtless is more rapid; at least, I have not found chloride of silver in conjunction with collodion as sensitive as with gelatine, but much more foggy—that is, more easily reduced, which is *not* sensitiveness to the action of light. "Then," you will ask, "why is it not more sensitive than bromide of silver under the same conditions?" To this I can only say, is it an ascertained fact that it is more sensitive than bromide when both are in conjunction with collodion? I should have been inclined to characterise the collodio-chloride plates I made over a year ago as foggy, thin, and insensitive, and not to be compared with bromide plates for sensitiveness.

* These "ideas," I now find, will have to be read *cum grano salis.*

Nevertheless, I now begin to think that I may be mistaken as to the inferior sensitiveness of chloride of silver, having prepared three emulsions as follows:—

1. A gelatino-bromide. 2. A gelatino-chloro-bromide. 3. A gelatino-chloride.*	Sufficient of the respective haloid salts to convert fifteen grains of nitrate of silver.

The chloro-bromide emulsion contained the salts mixed in their equivalent proportions and recrystallised, and all the emulsions were made with fifteen grains of gelatine to the ounce. The gelatino-chloride seemed to form more slowly than the others, but still by no means very slowly, I should say. The bottles were then kept warm for four hours, and ten grains of gelatine added to each, five grains only having been used to form the emulsion. I had only allowed for a fraction of excess of the soluble haloids, and on testing, curiously enough, I could detect none in the emulsions. Three plates were coated and washed together, then exposed to a badly-lighted subject for four minutes with a compound stereo. lens, aperture $\frac{f}{8}$, and then all developed in a dish together, the developer being that which Mr. Kennett now recommends for his plates, and which is a third weaker than formerly in ammonia and bromide.

The chloride plate (marked on the back previously to preparing it) came out first, and was pretty well developed when the high lights began to appear in No. 2, which latter was slightly before No. 1. I then added a half dose more of ammonia without any bromide, and did not take the plates out of this developer till action had apparently ceased, and the high lights were very dense. The water used for the developer was distilled.

On taking the plates into the light I found they had "come in" in the following order:—3, 2, 1, there being more detail in No. 3 than in either of the others. Still, a Kennett plate would have beaten it hollow, for some unexplained reason; and thus I have not yet established the superior sensitiveness of chloride of silver. But, as No. 3 has proved superior to No. 1 prepared under the same conditions, I think there is reason to hope that, upon some modification, the chloride may yet triumph. I have prepared a few bromide emulsions, but have never equalled the sensitiveness of Kennett's pellicle. I do not know what was the cause, but, though all the bottles were of the same size, the chloride of silver is somewhat coarser than the other emulsions; still, I should say that none of them were filtered. I do not know whether it is possible that the chloride of ammonium may act on the gelatine, causing it to become less glutinous; but I fancy I have noticed a want of "body" in chloride emulsions before, as I believe I do in the present.

I have found some difference in the colour of negatives produced by the bromide and chloride of silver; the latter inclines to a bluish-grey metallic colour, while the former is warmer in colour. It is exceedingly likely that under different conditions of development a change of colour would be apparent† I would remark that, in the negative I refer to, both sides of it have much the same appearance, the chloride being reduced to a much greater depth than is the case with the other plate; however, as it is the best exposed, this might naturally follow. Still, I think there is more contrast produced by the chloride than by the bromide, though it is possible that the colour may be less non-actinic. I shall refer to this hereafter.

I have again to-day exposed some more plates on the same subject, same lens and aperture, and, really, I have to contradict myself once more. The three plates (this time *dry*) were exposed for three minutes each, and then developed with what I may call "Kennett's developer." The chloride plate came out first, but the bromide afterwards trod so closely on its heels that I think they may be considered equal. The developer was strengthened with a half dose more ammonia.

Three more plates, exposed at the same time, were then developed in the same way, except that the same quantity of a solution of common salt was used instead of bromide. This time the bromide plate put in an appearance first; the chloride some way behind, and very foggy. Curiously enough, in both these cases I think the chloro-bromide plate has the worst of it. This, naturally, would make one suspicious as to the chloro-bromide being free from soluble haloids; however, I could detect none.

This experience so upset me that I took out four more plates, one being a "Kennett" plate.‡ The sun was shining through the trees from a clear sky this time, and I exposed each plate for two minutes. They were then developed together (as all the others were) in the same manner as the last, except that about three times as much restraining chloride was used. The result was the same as before, except that the chloride plate did not fog this time.

* The chloride and bromide of ammonium were used.

† In the plate I shall mention further down—that developed with the smaller quantity of soluble chloride—the reduced silver is very clear and metallic.

‡ I should mention that the "Kennett" plate fogged under the developer employed; but a good deal of detail was visible.

And now as to the cause of these discrepancies. I have mentioned that in my case of the other day the plates were in a *moist* state, whereas these last were *dry*. I do not think it likely that difference would alter the action of the solar spectrum, and am inclined to believe that some insidious difference in the intensity of the light crept in despite of my care.

I have already mentioned that in the chloride plates the high lights appear the same on both sides of the plate, whereas in a bromide plate, which has more detail, and therefore better exposed, the developing action does not seem to have reached the glass. In the subject to which I refer strong reflected light from a holly tree impinged on all the plates, and this is the light that has acted, I believe, more vigorously on the chloride that on the bromide plate. Does not this point to my theory that chloride of silver has less sensitiveness to the less refrangible rays than the bromide? I think that in a "well-lighted," open view chloride would follow close upon bromide of silver. I believe it likely that in future I shall use restraining chloride instead of bromide, as I have an impression that it is less liable to injure the latent image.

I think I should apologise for having misled you in the matter of chlorine displacing bromine from bromide of silver. I wrote this in faith, having once had a conversation with an analytical chemist on the subject of the different affinities of the halogens for silver. I was taking my cue from the dictum of the late Mr. Sutton; but my friend knocked the wind out of my body and sails by apparently reversing the order of things. However, I have now tried for myself, and I cannot make chlorine water change the colour of bromide of silver, though it immediately throws down the finely-suspended bromide in the water. Thus, I think, unless some one more able than myself can prove to the contrary, we may accept Mr. Sutton's dictum as the truth.

And now, in conclusion: I wish that some experienced chemist, rich in apparatus, including a spectroscope—of which I am destitute—would test bromide and chloride of silver as to their sensitiveness to decomposed light. A few experiments would, I am next to certain, elucidate to a great extent the cause of its comparative insensibility. No difficulty need be experienced in the development of gelatino-chloride plates by the alkaline developer, as I have proved to my satisfaction. I hope that this communication may tend to elucidate, or be the cause of bringing other minds to bear on, this subject. We often read to this effect—"If we could only develope chloride of silver," &c. Now is the time to do so; make it turn bromide of silver out of the field, as bromide is said to be doing to iodide of silver!—I am, yours, &c.,

Cotheridge Court, near Worcester, HERBERT B. BERKELEY.
January 26, 1876.

P.S.—As will be perceived by the date of the above letter, it was written before Mr. Webster's paper on *Chemical Affinity* was published. It will be seen that I have substantially contradicted my former statement that chlorine would replace bromine from bromide of silver, on the strength that I could not make it do so myself. Now, with all deference to Mr. Webster—for doubtless he will prove to be right—I have added chlorine water to bromide of silver, and even heated it to boiling point, but still the silver compound retained the characteristic colour of Ag. Br., and even seemed to become of a more pronounced yellow; still the smell of chlorine was present in the tube. This experience will, perhaps, serve to show how what I may call a "self-constituted chemist" may readily be deceived. However, I hope that any fallacies that may be published through my instrumentality—seeing that they appear in the cause of "more light," which I am glad to say has been shed by the Editors and Mr. Webster on the subject, and I hope will be by others—may be overlooked.—H. B. B.

[We have had much pleasure in reading the foregoing account of experiments by Mr. Berkeley, and are glad to find that he endorses our view of this question upon several points on which we previously appeared to differ. We think, however, that our correspondent is incorrect in supposing that bromide of silver is converted into chloride by treatment with cupric chloride; we have not found such to be the case, having tried the experiment incidentally while testing the process of intensification we published last year. In that mode of intensification the chlorine certainly leaves the copper and goes to the metallic silver forming the image, which would lead to the view that silver has a greater affinity for chlorine than has copper. With regard to the varying action of collodion and gelatine emulsions, we wished only to convey the idea that there appeared to be no reason why a chloride should act differently in one as compared with the other, except so far as the restraining action of the gelatine affects it. With this view our correspondent appears to agree.—EDS.]

To the EDITORS.

GENTLEMEN,—I note your remarks in yesterday's issue, and have also perused with pleasure Mr. G. W. Webster's article on *Chemical Affinity;* but, were it not that you appear to think otherwise, I should certainly have supposed that Mr. Webster took my side in the dispute. He will, perhaps, enlighten us further.

Where, however, either you or he have "explained" or "pointed out," the fact adduced in my letter of 15th inst. to be "valueless," or where, indeed, any reply worthy of the name to that letter is to be found I have failed to discover, and am afraid your readers who take an interest in this controversy will be equally puzzled, unless it be comprehended in the editorial dictum to that effect.

It is, however, of little moment, the main fact which I wished to establish, namely, that chlorine will, *per se*, displace iodine (or bromine) from its combination with silver, being substantiated by Mr. Webster and admitted by yourselves (*ante*, page 40). How, then, you can still attach any value to the fact that a soluble iodide will convert either bromide or chloride of silver into iodide I am at a loss to imagine. It would be equally as cogent, but at the same time quite as fallacious, to infer that carbonic and acetic acids had a greater affinity for silver than nitric acid, because this latter acid is displaced from its combination with silver by the addition of a soluble carbonate or acetate—such as the carbonate or acetate of soda—to a solution of the nitrate. The *proof* of the fallacy being that neither carbonic nor acetic acid will, *per se*, displace the nitric; and, further, that if we afterwards treat the resulting carbonate and acetate of silver with nitric acid the carbonic and acetic acids will again be displaced. So, in like manner, the *proof* of the fallacy that soluble iodide converts bromide and chloride of silver into iodide, in consequence of the superior affinity of the iodine for the silver, and the truth of my statement that it is owing to the superior affinity between the base of the soluble iodide and the bromine or chlorine previously combined with the silver, consists in this—that if we afterwards treat the resulting iodide of silver with either bromine or chlorine the iodine will again be displaced; and, further, that iodine will not, *per se*, displace either bromine or chlorine from its combination with silver. The same holds good with regard to the relationship between bromine and chlorine and silver.

No doubt, however, all this will be as speedily disposed of by some editorial dictum as all that I have previously written, and it would, therefore, be useless to continue the controversy, seeing you are not satisfied with such conclusive evidence of the fallacy of your views as has already been adduced. Consequently I must take leave of the matter, knowing full well, as I do, that my views being, as they are, the result of careful experimental research (and, not as you seem to have imagined, merely supposititious and conjectural), and being, moreover, in perfect harmony with that science (chemistry) to which photography is indebted for its existence, are capable of enduring the most searching investigation.

With regard to Mr. Webster's observations on the general subject of chemical affinities: I cordially acquiesce in all that he says with regard to the absurdity of endeavouring to establish an *absolute* rule of chemical affinity, which shall be good under *all* circumstances; but, nevertheless, Mr. Webster knows as well as I do that there are *general* laws which *do* hold good for all practical purposes, and that were it otherwise all chemical industries (including also the art of photography) would very soon be in a state which he can better imagine than I can describe.—I am, yours, &c., WM. ROBINSON.

Liverpool, January 29, 1876.

[We stated that our correspondent's *one proof* was valueless on account of the obscure nature of the mutual reactions existing between the halogens and haloid salts. We wrote, at page 25, that no reliance could for that reason be placed upon such an argument unsupported by other proof. Such proof we gave, but Mr. Robinson chooses to ignore it, and shelters himself behind his own impregnable position. Can Mr. Robinson reconcile his theory with the fact that (in spite of the alleged feeble affinity of the halogens for silver), if any soluble haloid be added to a soluble silver salt, the silver haloid is formed? Does this depend upon the greater affinity of the halogens for the non-silver base, or upon the superior affinity of the acid of the silver salt for the base of the haloid?—EDS.]

THE PHILOSOPHER'S PHILOSOPHY.

"There are more things in heaven and earth, Horatio,
Than are dreamt of in your philosophy."—*Hamlet.*

To the EDITORS.

GENTLEMEN,—In your last volume I made certain statements respecting the albumenising of plates, the truth of which has been verified by gentlemen whose qualifications are sufficient to satisfy me of the correctness of my observations, notwithstanding Dr. Nicol's unbelief. The latter thinks I wrote merely as a joke. Possibly he measures me by his own standard, as it certainly is a method of interpretation which can be freely and intelligently applied to the philosophy of my learned friend. The philosophy taught in the aromatic city may possibly enable its favoured recipients to avoid the trouble of any experimental test in dealing with Dame Nature. Such wisdom I have not, and it is unknown in Halifax.

I have not yet suggested any cause for the effect I have observed, contenting myself with saying to the learned Doctor that the ascent of a body, or, as he terms it, "walking upward," does not necessarily bid "defiance to the law Newton thought he had discovered." What on

earth is spiritualism introduced for? So far as my personal knowledge of spirits is concerned it is limited to one kind; and if ever I have the good fortune to come in contact with Dr. Nicol I hope to have material manifestation of the same, and enlarge upon its "defiance" of gravitation by holding a lump of sugar therein.

In saying my last on this subject, which has been forced upon me, I would suggest to Dr. Nicol to think of the fairness and nobility exhibited in ridiculing one in a place and at a time when he has no means of defence or retort, and that on a subject upon which, presumably, no experimental test has been made. Such is not, to my mind, the precise way a truly philosophic mode of thought begets.—I am, yours, &c.,

Halifax, January 29, 1876. W. E. Batho.

THE "SHEFFIELD PHOTOGRAPHIC SOCIETY."

To the Editors.

Gentlemen,—I have often noticed in the heading of each weekly issue of the Journal that, amongst others, it is the organ of the "Sheffield Photographic Society;" and as that Society is "among the things of the past," I think it would be right either to cross the word "Sheffield" out, or else that we Sheffielders should form a new Society, so fill up the gap, and let the Journal be what it professes to be. I am quite sure that, if it were properly seen into and made known, a "committee of ways and means" could soon be formed, as there are plenty of photographers in Sheffield, both professional and amateur, who would, I have no doubt, take a pleasure in forming a photographic society, and thus let Sheffield hold its own in the photographic world, as well as other towns which are otherwise of far less note.

I do not know of a town more conveniently situated for a Society of this kind than Sheffield is, as we have, close at hand, some of the most beautiful scenery in Derbyshire, besides being within easy travelling distance of the principal abbeys and old ruins of the north, where we could enjoy a trip now and then in the season, and thus, at these social gatherings, by comparing notes and helping each other, try and enable Sheffield to add her quota towards the advancement of our beautiful art-science.

As I think that through the Journal will be the best way of making a start, I shall esteem it a favour if you will kindly find room for this in your next issue, as I think it is high time that a move was made in the matter; and, if it should lead to anything tangible, I shall have great pleasure, so far as lies in my power, in doing all I can to further the object; and I think I might venture to speak for two or three amateur friends to do likewise.—I am, yours, &c., W. Dakin.

39, *Victoria-road, Broomhall Park, Sheffield, January* 29, 1876.

CANON BEECHEY'S PROCESS.

To the Editors.

Gentlemen,—Will you allow me to put, through your pages, a few questions to Canon Beechey relative to the emulsion process he has described in the Almanac?

In the first place, it is directed to albumenise the plates, and then a formula is given from which albumen is absent. Is this an accidental omission? or are the plates to be gelatinised, and not albumenised?

In the next place, I should be glad to know whether either the chlorobromised collodion or the finished emulsion may be kept, and, if so, for probably how long?

Then, may any staining be added to the emulsion without injury?

Lastly: since the article has appeared it has been strongly recommended to use sulphuric acid in emulsions in preference to hydrochloric or any other acid. Would Canon Beechey recommend it for his process?—I am, yours, &c., D.

February 1, 1876.

FASHION AND PHOTOGRAPHY.

To the Editors.

Gentlemen,—Seeing that your correspondent, "Free Lance," has fired a shot at an article of mine in another journal, allow me to say that my remarks were not simply intended as a tirade against present fashions, but to advocate more especially the reintroduction of the 5 × 4 portrait, which, unfortunately, has been pushed aside by the awkward cabinet, and now by the ugly, elongated cabinets, whether known as "imperials" or "boudoirs." Fresh sizes are not so much needed to give an impetus to trade as good work. Let photographers study lighting and posing more, and adopt the sizes most generally approved —such as 24 × 20, 15 × 12, 10 × 8, 5 × 4, and *carte de visite*—and there need be no lack of custom. Our aim should be to educate the public taste to the extent that they should not be contented any longer with the second-class style of work that is turned out in a wholesale fashion by large commercial firms without any knowledge or regard for art whatever. Good artistic work will never be cheap, and yet in the end it is the cheapest, as many have found to their cost.

Why is it so many firms charge so low a price and insist upon the money first, if not that they have no confidence in their work as sufficiently good to retain their customers, and therefore get all they can out of them and attract the multitude in "cheap jack" fashion? My remarks on fashion were as follow:—

"All these recent sizes have been intended chiefly for full-length portraits, and the reason that they are not popular is to no small extent attributable to the present extravagant, inelegant, as well as inartistic style of dress adopted by ladies, especially those of tender age—in fact, just that age when photography should come in and assist, by depicting them in their best attitudes, with their winning smiles, piercing eyes, and flowing manes, or more graceful curls. The want of taste in dress displayed by ladies of the present day, by the mixing up of incongruous colours and the patchwork kind of costume generally adopted, has had a considerable influence in the noticeable decline in of full-length portraiture. It is really a treat in these days to see a lady enter the studio with a nice, full-flowing skirt of silk, with a moderate amount of crinoline, instead of the tight-fitting, scanty skirts now adopted, wound tightly round the waist in front and hunched up at the back in a most inartistic fashion, more resembling a bundle of rags than what is termed a 'costume.' West-end swells, a short time ago, wore trousers that fitted so closely round the 'understandings' that to sit down was next to an impossibility; so ladies must now likewise wind themselves round so that they can scarcely walk, and, as to sitting comfortably, that is out of the question. Again: tight-lacing, which was supposed to be a thing of the past, having been universally condemned as most prejudicial to health, is, we find, by the new corset, re-introduced, and ladies are once more to barricade themselves in steel as if they were ironclads. Are elongated waists graceful? Are dog-collars that cover up a lovely neck desirable? Are the extra-high heels any advantage except to weaken spines and bring on premature consumption? Surely photographers should use all their influence to stay such retrogression as to art in dress; for the present fashion, if continued, will in a few years' time result in the photographs of the present time being held up as a proof of the follies and fooleries of this fast-going age, and be known as one in which ladies ignored the harmony of colours and neglected the grace of nature, in order to dress themselves up so as to be a spectacle to their own sex, as well as the astonishment and disgust of all sensible men."

In conclusion: I agree with "Free Lance" that a little firm persuasion does wonders, such as removing ugly combs from the back of the head, square or triangular collarettes, and even dog collars and stupid bows stuck on top of the head; in fact, I find it a good plan to keep in stock a neatly-worked collar, a brooch, also a pair of plain cuffs, a suitable fan, and even a sprig of ivy and a few flowers, &c. I also suggested in the article referred to the manufacture of albums to take six *cartes de visite* in a page, four (5 × 4) in another page, and occasional blank pages for 10 × 8 portraits or views.—I am, yours, &c.,

68, *Canonbury Park South, N.*, Geo. Hooper.

February 1, 1876.

Miscellanea.

Burnishing Made Easy.—As there are so many of the photographic fraternity using the burnisher of some make or other, and as the usual method of using alcohol or water with soap in solution is open to serious objections, we propose the following as a substitute:—Take water six ounces, white Castile or soda soap quarter ounce; dissolve by heat. When dissolved take a cloth—or, better, a sponge—perfectly clean, and immerse it in the solution, squeeze slightly and dry. When ready to burnish, rub the surface of the photograph with the dry sponge or cloth and burnish; the result will be all that can be desired. The objections to using the alcohol or water with soap in solution is that the enamelled surface of the nicer qualities of card mount is soluble in alcohol, and the enamel of cheaper grades in water; in either case there is danger of getting particles of enamel on the burnished plate, the heat causing it to adhere and injuring the surface of the next photograph burnished. By using the sponge there is no danger of raising the enamel, and no liquid being applied the surface of the card and photograph is uninjured.—E. A. Cleaveland, in *Phil. Phot.*

Fixing Prints.—In a recent number of the *Philadelphia Photographer*, Mr. C. F. Richardson says:—"Too little attention has been paid to a fact announced by Mr. Spiller several years since in relation to the perfect fixing of prints. It is well known that albumenised prints exposed to light rapidly change to a cheese colour in the lights, while there is no real *fading* of the print whatever. Mr. Spiller found that the addition of carbonate of ammonia to the hypo. fixing bath aided in dissolving the albuminate of silver remaining in the paper, which seemed to be the principal cause of this discoloration. I have used this since his announcement, and have repeatedly proved the truth of his assertions. It may not absolutely prevent the ugly change, but it very much retards it, so that prints exposed to strong light retain their brightness much longer. It also prevents the possibility of the hypo. being acid, and thus causing *real* fading. The use of common salt in the hypo. will almost invariably prevent blistering in the hypo., which causes those beautiful (?) plum-coloured spots on drying. My formula for the fixing solution stands, therefore, as follows:—Hyposulphite of soda, four ounces; carbonate of ammonium, one ounce; common salt, two ounces; water, one quart."

A Simple Toning Bath.—The following (says Mr. C. F. Richardson in the *Philadelphia Photographer*) is only new in the application of heat for preparing the bath for immediate use. It is a very convenient and economical bath, and, being quite neutral, tones readily and without

mealiness. Keep the chloride of gold in an eight-grain solution. About an hour before toning drop into a test tube a few grains of powdered chalk; measure out sufficient gold solution for the batch of prints (one grain for from two to four sheets of paper being sufficient); pour it on the chalk, and boil briskly over a spirit lamp, taking care not to boil it over. The advantage of the boiling will be seen by the brisk effervescence between the free acid of the gold and the chalk as soon as they are moderately warm. Thus in three minutes the solution is as effectually neutralised as by standing cold over the chalk for twenty-four hours. Add this solution to sufficient water to handle your prints in, and your bath is done. Use the solution over and over, adding fresh gold neutralised in the same way each time of using. A few grains of acetate of soda may be added if a somewhat darker tone be desired, but do not use much.

EXCHANGE COLUMN.

No charge is made for inserting these announcements; but in no case do we insert any article merely *offered for sale*, that being done at the small cost of one shilling in our advertising pages. This column is devoted to exchanges only. It is imperative that the name of the person proposing the exchange be given (although not necessarily for publication, if a *nom de plume* be thought desirable), otherwise the notice will not appear.

Wanted, lantern transparencies in exchange for good microscopic slides. List of subjects exchanged.—Address, H. E. Freeman, 48, Woodstock-road, Finsbury-park, N.

A good half-plate patent portrait lens by Derogy, with two extra combinations for *cartes* and whole-plates, will be exchanged for a square camera, from 12×10 and upwards, difference in cash.—Address, G. Hadley, 2, Victoria-street, West Lincoln.

A Dallmeyer's 1A wide-angle landscape lens and 5×5 bellows camera, with folding tailboard and rising front, both equal to new, offered in exchange for a good cabinet burnisher, or *carte* lens of large diameter and about six inches focus.—Address, A. Davidson, photographer, New Lanark, N.B.

ANSWERS TO CORRESPONDENTS.

☞ *Correspondents should never write on both sides of the paper.*

Notice.—Each correspondent is required to enclose his name and address, although not necessarily for publication. Communications may, when thought desirable, appear under a *nom de plume* as hitherto, or, by preference, under three letters of the alphabet. Such signatures as "Constant Reader," "Subscriber," &c., should be avoided. Correspondents not conforming to this rule will therefore understand the reason for the omission of their communications.

Amateur (Leeds).—The club is defunct.

L. V.—As much as the solvent will take up.

J. Ewing.—The spots are probably due to bronze powder, as recently described. Send us one of your mounts.

Oporto.—Mr. J. A. Forrest, of Liverpool, will be able to supply the various kinds of glass required for your experiments.

P. W. H.—The formula is complicated to an unreasonable extent. Omit *all* the ingredients except the haloid salts and gelatine.

Perak War.—The exposure appears to have been insufficient. We have frequently seen this process worked, and always with success.

G. P. B.—The most suitable description of lenses for your purpose will be a pair of stereo. landscape objectives of about five or six inches in focus.

An Old Novice (Pendlebury).—Thanks for your suggested improvement on the phosphorus lamp. We shall utilise your remarks in our next issue.

R. D.—See Mr. Foxlee's article on the albumen process in our current Almanac. You may produce exquisite transparencies by means of the information there given.

M. O'C.—In the present number you will see the first of a series of articles on recently-patented inventions. The one respecting which you inquire will be published in a fortnight.

F. S. K.—There are some kinds of gelatine which, owing possibly to the presence of minute fatty particles, give rise to the appearance you describe. It will be advisable to change the sample of gelatine.

J. D. L.—We are unable to give any information respecting Mr. Kennett's method of obtaining such exalted sensitiveness. The other matters shall receive attention, and we will communicate with you in the course of a few days.

Wm. Boyd.—A concentrated solution of pyrogallic acid, such as you desire, may be made in alcohol; a hundred grains to the ounce is a suitable degree of strength. An aqueous solution of pyrogallic acid will not keep for any length of time unless you mix with it a little tannin.

W. H. F. says:—"Will Mr. Willis, or any correspondent of the Journal who knows, inform the writer the method of preparing the chloro-platinite of potassium? I have a considerable quantity of the solid perchloride of platinum, and should be glad to learn how to prepare Mr. Willis's compound."

B. Harris.—We have seen *many* lenses produced by the late Mr. Goddard; indeed, we believe that there was not a single objective invented by him with which we are not acquainted, having had not only his working books in our possession after his decease, but also several of his lenses.

J. F. Rossiter.—The eburneum process is a method of making positives by backing up a transparency on glass with gelatine containing a white pigment. This is applied hot, as a varnish, and when stripped away from the glass, after being dried, it carries with it the film containing the picture.

Engineer.—The simplest way by which to prepare a glass plate for drawing on with a needle point is to tint paraffine of an orange colour, and then mix up with some oxide of zinc. Varnish the plate with this to the thickness of thin card. When cold it is ready for use. A piece of black velvet or other dark-coloured material must be placed behind it when it is being drawn upon, and every stroke or touch of the needle must penetrate through to the glass. When finished, it is ready for being used as a negative without further preparation.

A Manchester Man.—This correspondent begins to feel alarmed lest a method of finishing negatives which he has employed for several years is an infringement of M. Lambert's patent. He has practised his process *sub silentio*, and desires to know how he will be affected by the patented claims of M. Lambert. Premising that there is nothing whatever in any existing patent to prevent "A Manchester Man" from continuing to finish his negatives (which, by the way, are landscapes) in the way he has hitherto done, we may state that it consists in giving a coating of a varnish having a *fine* tooth to the front of the negative, and a similar coating of varnish having a ground-glass texture to the back of the plate. On the back he works with a crayon stump charged with blacklead or other opaque powder, while on the face he produces his effects with a finely-pointed and hard pencil. The *principle* of working is similar to that of M. Lambert; for this gentleman uses layers of paper.

Received.—*The Journal of the Quekett Microscopical Club*, and also the Tenth Report, President's Address, and list of members of the same club.

☞ Editorial Communications should be addressed to "THE EDITORS"—Advertisements and Business Letters to "THE PUBLISHER"—at the Offices, 2, York Street, Covent Garden, London, W.C.

South London Photographic Society.—At the next meeting of this Society, to be held on Thursday next, the 10th instant, the Rev. F. F. Statham, M.A., President, will read a paper on *Magnitude as an Element of Attraction in Photography*.

Photo-Enamels.—We have received from Mr. Watson, of Hull, an excellent specimen of his work in this fascinating branch of our art-science. The subject is a portrait, the tones being deep and rich, with good gradation.

LONDON GAZETTE, *Friday, January* 28, 1876.

Public Examination.

W. Cuthbert, Scarborough, albumenised paper manufacturer. February 8.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
February 7 ..	West Riding of Yorkshire......	Victoria Hotel, Bradford.
,, 8 ..	London (Annual Meeting)	9, Conduit-street, Regent-street.
,, 10 ..	South London	John-street, Adelphi.
,, 10 ..	Manchester,..............	Memorial Hall, Albert-square.

METEOROLOGICAL REPORT,

For the Week ending February 2, 1876.

Observations taken at 406, Strand, by J. H. Steward, Optician.

These Observations are Taken at 8.30 a.m.

Jan.	Bar.	Wind.	Wet Bulb.	Dry Bulb.	Max. Tem.	Min. Tem.	Remarks
27	30·40	S	44	46	51	39	Foggy
28	30·34	SE	42	43	49	40	Foggy
29	30·32	SE	35	35	50	33	Foggy
31	30·46	SE	45	47	55	44	Cloudy
Feb. 1	30·21	S	41	44	50	43	Dull
2	30·15	NW	44	45	—	42	Dull

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THE BRITISH

JOURNAL OF PHOTOGRAPHY.

No. 823. Vol. XXIII.—FEBRUARY 11, 1876.

MR. M. CAREY LEA'S SIMPLIFICATION OF THE WASHED EMULSION PROCESS.

Mr. M. Carey Lea this week sends us a description, printed in another column, of a further simplification of the washed emulsion process. Since the first publication of the latter and its subsequent modifications it has made such progress in public favour, and has proved to be so simple and, at the same time, so practically useful, as to hold out hopes of one day becoming *the* process in general use. Under these circumstances any simplification or improvement of the process as it now stands is certain to meet with a warm reception and cannot fail to prove a benefit to photographers generally.

The objections hitherto raised against the employment of this method have been twofold—the trouble and time necessary in the preparation of the pellicle, and the waste of the solvents used in forming the original emulsion. These objections having been thoroughly discussed upon more than one occasion previously, we shall not now stay to discuss how far they may be valid, but will at once proceed to the consideration of Mr. Lea's latest suggestions. The simplification signalled in Mr. Lea's communication only attempts to obviate one of the faults mentioned above; it is offered as a means of lessening the trouble and curtailing the time occupied in producing the pellicle, while, at the same time, it is stated that an equally good result is obtained.

It is quite obvious—and the idea is by no means a new one—that if, instead of pouring out the first emulsion and allowing it to set, it can be precipitated by mixture with water, not only is the time usually occupied by the evaporation of the solvents entirely saved, but in consequence of the more complete exposure of the sensitive mass to the action of the water the process of removing the soluble salts must be very materially shortened; while, from the nature of the resulting pellicle, the drying—always a tedious process—will be considerably facilitated. But unfortunately such a course has hitherto been found incompatible with the production of a satisfactory result; and, independently of the working qualities of the pellicle, the loss in weight has been stated by Mr. W. J. Stillman, we believe, to reach as high as forty per cent.—a point which very seriously affects the economy of this method. Mr. Lea, however, by a particular course of action, believes such a loss to be entirely obviated, and speaks of the results he has obtained as quite equal in every way to those produced by the older method.

The novelty of Mr. Lea's plan consists in pouring the washing water (or aqueous organifying solution) into the emulsion, or *vice versâ*. How far this line of procedure can lead to so entirely different a result as that specified by Mr. Lea we are unable at present to comprehend, and, having yet had no time to experiment with it, we are scarcely in a position to say how far it is likely to meet the expectations of emulsion workers in this country. There are certain facts, however, closely connected with the subject, which have come under our notice while experimenting in other directions, that may be worth a moment's consideration as assisting towards a true comprehension of the theory involved.

We may premise that, several months ago, we attempted the preparation of a sensitive collodion pellicle by precipitation with water in various modes, but, unfortunately, without the slightest success. The addition of the emulsion to the water, in a suitable vessel, in our hands conduced to the production of what we may term a "double product:" a portion of the pyroxyline and bromide is at once precipitated in the well-known spongy form, while a second and considerable portion remains emulsified and only subsides in the form of fine powder after standing for many hours, or even days. The decanted liquid, consisting of the diluted solvents, may be filtered and boiled in a glass flask or test tube, when, as the volatile portion of it is drawn off, a scum is gradually formed possessing all the characteristics of precipitated pyroxyline. This tends to show that a considerable proportion of the pyroxyline must be lost by remaining in solution in the diluted ether and alcohol. The precipitate spoken of above is found to consist almost solely of bromide of silver, and, after washing, drying, and re-emulsification with the spongy mass first formed, tends only to the production of a coarse, granular film, quite useless photographically.

This result, repeated more than once, with modifications, led to the conclusion that the method was hopeless, and here, it would appear, Mr. Lea agrees with us. But in another course of experiments upon the comparative solvent powers of the ether and alcohol in various stages of dilution, we repeated, almost to the letter, the suggestion contained in Mr. Lea's article. Wishing to find out to what extent water might be added to an emulsion, for the purpose of dissolving the silver nitrate without danger of precipitating the pyroxyline or haloids, we placed in a large bottle two ounces of emulsion, to which we added successively, with violent agitation, measured quantities of water, commencing with one drachm at a time, increasing the dose as the operation progressed.

To our astonishment we were unable to produce anything approaching to precipitation, as we understand Mr. Lea to mean. After filling the bottle (a twenty-ounce one) the mixture still retained the appearance of a smooth emulsion; but when filtered the solid matter was retained on the filter in a state of a fine pulp, while the clear filtrate upon boiling showed traces, though slight, of pyroxyline in solution. After a further dilution with water the emulsion evinced no greater tendency to precipitate, while the solid matter filtered out, when washed, dried, and re-emulsified, gave even a worse result than in the previous case. We should remark, however, that with different samples of pyroxyline, as well as with different proportions of the solvents, slightly varying results, as regards the precipitate, were noticeable, though in no case were we able to recognise a chance of future success.

So far we have only spoken of one portion of the subject, viz., the action of the diluted solvent upon the pyroxyline; here, however, we must call attention to another branch of equal, if not greater, importance. We have pointed out on a previous occasion, in speaking of the importance of not washing the pellicle until thoroughly set—a point, by the way, upon which Mr. Lea and ourselves differ somewhat—that the organic silver compound upon which the density and, as some believe, the rapidity of the emulsion so much depend is soluble in alcohol; the effect of washing the only partially-"set" pellicle is to form a diluted spirituous solution in the body of the sensitive substance, which, as it makes it way to the surface and mixes with the washing water, carries with it in solution the valuable silver salt.

But in the case in point, where the whole of the solvents are present and scarcely more water than would be employed to wash the semi-dry mass, it is evident the solvent effect must be greater. An exception, however, which points to a possible solution of the difficulty is to be found in the case of silver albuminate, which is not soluble in alcohol. Mr. Lea treats his emulsion, first of all, with the compound of albumen, gum, tannin, &c., which he so strenuously recommended some time ago, the effect of which, in the presence of free silver, would be to precipitate the insoluble albuminate, while the tannate, gallic, &c., would remain in solution in the acid mixture! Furthermore: the presence of a considerable proportion of the albuminate in the dried pellicle would replace the pyroxyline lost in washing, and would account for Mr. Lea not discovering so great a loss in weight.

Even then, however, presuming the difficulty as to the successful precipitation to have been surmounted—and this, we may say, is probably a matter dependent upon the nature of the cotton used—it has been stated that albuminate of silver formed in this manner and dried refuses to re-emulsify, remaining insoluble. We cannot, however, hazard an opinion upon that point until we have carefully tried the experiment, which we shall proceed to do as soon as possible. Meanwhile we do not put forward these remarks as antagonistic to our friend Mr. Lea's modification, but to give such hints as may prove useful to those who may try the method and not at first succeed. If it only bear out the good opinion of its originator it will undoubtedly prove an important simplification.

PERMANENCY OF PIGMENT PRINTS.

In common with all who have carefully watched the progress of current events we have long thought, and frequently expressed the opinion, that the time must come when silver should give place to carbon in the production of positive prints from photographic negatives; and, from the interest manifested in connection with the subject wherever two or three photographers meet together, it would seem as if the consummation were nearer than we, at least, had anticipated.

We are aware that shortly after the first sounding of the key-note of carbon printing in half-tone—the method of developing on the side of the tissue opposite to that on which the light had acted—carbon prints quite equal in all desirable qualities to the best silver prints were frequently exhibited; but their production was confined to a few operators, whose success was attributed to the possession of exceptionally good negatives, or they were credited with a skill in manipulation which the mass of photographers scarcely hoped to attain. Under the influence of some such impression many operators made a few rough experiments; and, as the highest degree of success in this as in most other photographic operations can only be attained after much practice, it is not to be wondered at that the results were not very promising. Within the past few months, however, things have taken a decided turn. From various causes—not the least of which is the success achieved by M. Lambert and some of his pupils—the interest in carbon printing has been awakened anew, and we now often hear of one and another of the photographers in extensive practice resolving to abandon silver and adhere to carbon in the future. We meet with numerous professional and amateur photographers who can take from their pockets and exhibit with commendable pride specimens of their experiments in carbon printing that cannot fail to please the most fastidious taste, and which are in every respect equal to anything produced in silver on albumenised paper.

The secret of such marked success at the present time is somewhat difficult to discover, seeing that the experiments are made by generally the same hands which in previous operations produced only discouraging work. It may be presumed that in their determination to stop at nothing short of perfection the manufacturers of tissue have so improved their productions as to do away with most of the difficulties that used to be encountered; or, perhaps—and this is the more probable explanation—the undoubtedly fine results which M. Lambert and others have recently shown to be ordinarily obtainable have given force to the brain and power to the hands, and, in consequence, the operator goes to his work with the knowledge that what he aims at *can*, instead of *may*, be done.

Whatever be the true explanation, the fact itself is abundantly evident that carbon printing has assumed a phase which cannot be ignored, and that silver printing will undoubtedly, in a very short time, be at least largely superseded. Under this impression we, whose duty as journalists is not only to record the progress of passing events, but also to keep our readers *au courant* with matters less generally known, think it right to direct attention to a question occasionally raised as to the assumed permanency of pigment printing, or, rather, of the prints thereby produced.

We may say, at the outset, that, although we do not sympathise with those who condemn all silver prints on the ground that they must necessarily fade, we yet should hail the universal adoption of carbon printing as a very decided step in advance; because, although an ordinary pigment print may not be so permanent as is generally believed, it is nevertheless, under certain conditions, much less likely to be affected by atmospheric influences than a deposit of silver and gold in an albumen medium. We hope, therefore, it will be clearly understood that the object of the following observations is not to check the present tendency towards pigment printing, but simply to hint to the makers and users of carbon tissue that there may be room for still further improvement in their productions.

Silver prints are supposed to be liable to fade from two causes—first, from the fact that, unless much care be exercised in the washing, traces of the hyposulphite salts may be left in the texture of the print, which will, sooner or later, enter into combination with the metals of which the image is formed; and, secondly, though in a less degree, from the action of atmospheric impurities on those metals whereby the same destructive effect is brought about. With regard to so-called carbon prints, we think there are three causes which may possibly lead to their deterioration, but which, we believe, may not be difficult to guard against. These are—the solid matter or pigment of which the image actually consists, the material by which the pigment is kept in position, and the salt or salts of chromium employed in the manipulation of the tissue.

The very general belief in the permanency of pigment prints undoubtedly arises from the fact that carbon in the form of lamp-black is one of the most stable substances in nature; but it should be remembered that bodies other than carbon enter into the composition of the tissue at present in use. Mr. J. W. Swan, in the course of his experiments, soon discovered that ordinary carbon would not give a colour suited to the popular taste; and, if we mistake not, he recommended the addition of some of the lakes, and even some of the aniline dyes. Now, we need hardly say that a print the beauty of which in any degree depends on such fugitive colours is not likely to be a "thing of beauty" for any lengthened period; and those who have done much in pigment printing know how extremely thin, especially in the more delicate parts of the print, is the deposit, and will easily understand what would be the effect of the decoloration of any considerable portion of the body of such an image.

That this fear is based on more than merely theoretical grounds is proved from some facts connected with an enlargement of a fine "bit" of Scotch scenery exhibited in the window of an extensive printseller some time ago. When first exhibited it was of a rich, warm tone, but the latter, as we noticed it day by day, gradually became fainter and fainter till, after the lapse of a few months, it assumed a sickly greenish-black, with entire loss of some of the more delicate half-tones to which it had been so much indebted for its former beauty. We do not suppose that the professional manufacturers of pigment tissue are ignorant of this, or that they are not thoroughly alive to the necessity of using only the most permanent colouring *matériel* that can be obtained; but the hint thus given may be of use to those of less experience who may wish to prepare tissue themselves.

Another cause of suspicion as to the permanency of pigment prints is found in the gelatine by which the pigment is kept in its place. In the case of an engraving the particles of carbon are enveloped in a resinous varnish, which, becoming oxidised, is practically unaffected by air or moisture; but gelatine, so far as we know, undergoes no such change, and in consequence of its hygroscopic qualities is liable

to be affected by atmospheric or other moisture. There is in the minds of photographers a general belief that the gelatine of which the image is formed is generally hardened or rendered insoluble by some of the alums or otherwise. This may in some cases be done and be rather successful; but we have before us, while we write, six carbon prints by as many different processes, all of which have been slightly moistened, and from everyone of which the swollen and softened portions forming the shadows may be removed by a slight touch with the finger. We do not think this is an objection of serious importance. There are many substances by which gelatine is rendered insoluble, and we have no doubt that our experimentalists will soon get over the apparent difficulty.

The last cause of possible fading at which we shall hint is the possibility of some of the chromium salts being left in the film or developed tissue, and this also we know to be more than a theoretical objection. Anyone who will take the trouble to prepare a piece of colourless gelatine tissue, and, after drying, immerse it in a solution of potassium bichromate, dry it, and then notice the amount of washing required to remove every trace of the colour, will easily understand that in pigment printing, as generally carried on, a considerable amount of the chromic salts must be left. What the effect of these salts may be we are not prepared to say, but their well-known oxidising and deoxidising effects make it extremely desirable that they should be eliminated as far as possible.

We again repeat that, in all this, we have not the slightest wish to throw cold water on pigment printing, but rather are anxious to help on the good work to the utmost of our ability, being under the impression that the suggestion of any weak points it may have with a view to their being strengthened, and the pointing out of any faults in order that they may be remedied, is, at least, one good way to give pigment printing useful assistance and aid it on its way to permanent popularity.

RECENTLY PATENTED INVENTIONS.

No. II.—ALBATYPE PLATES.

It is very probable that eventually there will be a large demand for white metallic plates of the kind euphoniously designated "albatype." Several months have elapsed since we spoke of the application we had made of some of them to carbon printing, when our experiments came to a temporary stoppage in consequence of our having got to the end of our supply of plates, none of the description being procurable in England. After a short period we were enabled to prepare plates for ourselves which were, at least, quite equal to those that had been received from America. *How* these home-made plates were prepared may form a subject for an article at some future time; meanwhile, we are enabled to describe the means adopted by Messrs. Hedden and Hill, of Worcester, Massachusetts, and for which they have obtained a patent in this country.

The process is of a twofold character, consisting, as it does, in the coating of the metallic plate with a white pigment or enamel, and in the subsequent protection of such "enamel" by the application of size. The enamel is comprised of an emulsion composed of collodion and oxide of zinc prepared in the following manner:—

Supposing five ounces of the enamel are to be made, thirty grains of gun-cotton are put into a bottle and two and a-half ounces of alcohol added to it. After the cotton has been allowed to soak for a few minutes about two ounces of ether are added, by which the cotton becomes dissolved, and, after a little shaking, half-an-ounce more of ether is then added. It will thus be seen that the ether and alcohol are present in equal proportions, or two and a-half ounces of each.

Three hundred grains of white oxide of zinc having been placed in a clean, dry mortar, and having been well pulverised, about one-fourth of the five ounces of collodion, made as already directed, is poured upon it and stirred with a pestle until a smooth, creamy paste is obtained, after which the remainder of the collodion is added and the intimate blending of the whole ensured by mixing it with the pestle. After being allowed to settle for a short time four ounces of this "enamel" are decanted into a bottle, in which it is kept ready for use. The manner of using it is to shake the bottle thoroughly, then allow it to settle for ten minutes, and fill a small bottle with it from which to coat the plates.

As yet we have said nothing concerning the plates. It is preferred that they should be the black "ferrotype" plates in occasional use for taking collodion positives upon. They are made of thin sheet iron, covered with an elastic coating of baked linseed oil for the backing. Other surfaces may also be employed, the language of the specification being—"other metallic plates, cardboard, leather, wood, and many different materials may be used for this purpose."

The white "enamel" is applied to the intended plate by pouring it on, in precisely the same manner as the collodion is applied in the preparation of a negative, and, after allowing about a minute for the setting of the film, the plate is placed in a vessel of water for a few minutes, and then subjected to the action of a stream of water for several more minutes, this stream being applied by a faucet. While still wet the plate is immersed in a sizing solution made as follows:—

Gelatine (Cox's preferred)	40 grains.
Arrowroot	40 „
Sugar-candy	80 „
Water	8 ounces.

Put the gelatine in two ounces of the water to soak for an hour; then apply gentle heat until it is all dissolved; boil the arrowroot in six ounces of the water, and mix these two solutions while warm; then add the candy, and dissolve it in the mixed solutions of the gelatine and arrowroot. In this solution the enamelled plates should be allowed to remain for about ten minutes, and are then removed and dried. Plates thus prepared are now ready for sale.

The patentees do not confine themselves to the method of proceeding, nor to the precise *matériel* we here describe, as both may be slightly modified so long as the essentials of their invention are adhered to. Without introducing any critical remarks upon the invention, we content ourselves at present by describing it, merely expressing the hope that alba plates, whether prepared by this or any other process, may soon be introduced into general use in connection with pigment printing, for which they appear to be so well adapted.

No. III.—HARE'S AUTOMATIC CHANGING-BOX.

The new changing-box recently introduced by Mr. George Hare received a preliminary notice in this Journal a few months ago, and it is now in the hands of numerous landscapists, a great number of the boxes having, we understand, been already manufactured and sold. We are now enabled to supply detailed particulars as to the nature of the invention, the specification of the patent having been published.

The invention consists in an improved apparatus for effecting the transference of sensitive photograph plates from the plate-box to the dark slide of the camera without subjecting them to the action of light.

The Ottewill changing-box, long known to photographers, necessitates several independent acts, neglect of any of which endanger the safety of the whole of the plates contained therein.

In this improved apparatus the movements are made automatic, and are placed beyond the control of the operator, so as to render the admission of light impossible. The aperture of the box is closed by means of a shutter acted on by two springs, this shutter being opened only by the attaching of the camera slide, to which the plate is to be transferred and closed by the act of removing it. Unlike any shutter of a similar kind, this has a long tail-piece, which acts between guides, and thus secures parallelism of motion. The shutter and springs are sunk into the body of the cover of the box so as to be incapable of being tampered with without taking the parts asunder.

Instead of the rigid sliding tops peculiar to previous transfer-boxes, Mr. Hare employs a flexible sub-top, which passes down into a well inside of the box. This sub-top may be formed of any flexible material, but he prefers a series of wooden laths, glued or affixed to a band of leather or textile fabric the full width of the lath, in the manner well known to makers of photographic apparatus.

Transfer-boxes have hitherto been filled with plates from the top; in this box the plates are inserted from the bottom.

The dark slide used in connection with this box differs from others previously constructed, by having the end aperture closed by means

of a piece of metal or opaque material projecting from the back (which works on an axis at the further end), and which serves to exclude light from the plate. This back, which has a spring catch lock, is so constructed that by pressure upon it the aperture is closed and the plate retained firmly in its place, while by lifting a bolt the plate is liberated and the end thrown open to permit of its egress.

The special claims in connection with the invention are—1. The inserting by means of morticing or otherwise in the body of the lid of the changing-box the metallic shutter with its springs and parallel guide pieces. 2. The flexible cover for the changing-box, as described. 3. The hinging of the back of the dark slide at one end, together with the method of fastening in the photographic plate by means of a spring catch lock, brought into operation by pressing forward the back, as described.

In writing, last week, upon the subject of preservatives we put forth one or two ideas in opposition to the view held in some quarters, notably by Mr. M. Carey Lea, that some preservatives exercise the effect of accelerators. We are pleased to find that our opinion is shared by Colonel Stuart Wortley, who contributes a short but interesting article on the subject to our present number. In the case, however, of organic additions to emulsions, Colonel Wortley and ourselves apparently differ slightly. We stated our view very distinctly last week when, in speaking of the *supposed* increased rapidity conferred by certain organic silver salts in emulsion, we said—"It is rather, as we believe, the increased vigour conferred by the organic silver compound which leads to a misapprehension of the real comparison." We hold that a film of pure bromide of silver (if such were obtainable), prepared in a certain manner, will be found to be more readily impressible than a similar one which has undergone subsequent treatment with an organifier; or, in the case of emulsions, if two be prepared, one with, the other without, any organic addition, and each possessing the highest degree of sensitiveness it is possible to attain with the particular formula employed, the one which is free from any extraneous organic matter will not be found inferior in point of rapidity to the other. At the same time, we do not for a moment deny that the organified sample will have the *appearance* of greater rapidity, more especially in the darker parts, which under the effect of intensification will "come up" much stronger owing to the presence of the organic element. With respect to Colonel Wortley's question regarding the relative sensitiveness of collodion and gelatine emulsions, we not only agree with him, but go further, believing that a much greater degree of rapidity will be obtained with collodion emulsions than with gelatine *when we only master the way of doing it.* At present it is known that with collodion emulsions the more we increase the sensitiveness the nearer we approach to fog; and in very rapid emulsion work it is absolutely necessary to employ a "restrainer" to prevent such fog. But there are various descriptions of "restrainers," which exert their action in different directions; thus we have "restrainers" of chemical action, of development, of fogging, and of sensitiveness—the latter should, perhaps, be called a "destroyer." As we increase the rapidity of the collodion emulsion it becomes necessary to employ a fog "restrainer," which in all probability also exercises a retardent influence upon the sensitiveness, thus preventing us passing a certain point. With gelatine, on the contrary, the vehicle itself, if the emulsion have been properly made, restrains the fog without any corresponding retarding action upon the rapidity. It remains now to discover a "fog-restrainer" which does not possess the property of impairing sensitiveness. We shall be happy at all times to receive and record Colonel Wortley's experience in such matters.

A SIMPLIFICATION OF THE WASHED EMULSION PROCESS.

When the plan of washing emulsions to get rid of the soluble and crystallisable salts, &c., was first proposed, it became immediately evident that if the same result could be obtained by pouring the emulsion into water, and so precipitating the insoluble portion, it would be far simpler and easier. It was stated, however, that this method had been tried and had resulted in total failure. About the same time, or shortly before, appeared the experiments of a French photo-chemist (M. Camusat, I think) to the effect that when plain collodion was poured into water the pyroxyline precipitated was scarcely over one-half of the original amount. This experiment I repeated carefully at the time, and found the results to correspond entirely with the statements. The pyroxyline, collected and dried, was a soft white substance in a state of great division, and, even when carefully collected, weighed just fifty-three per cent. of the amount which had been dissolved in the alcohol and ether, indicating a loss of very nearly one-half. This seemed altogether confirmatory of the statement that no good results in washing emulsions could be got except by previous drying, and I made no experiments in that direction until recently.

It seemed, however, so desirable to simplify the washed emulsion process that I have carefully examined this part of the subject, and I find that whatever difficulty may exist relative to the precipitation of an emulsion may be entirely got rid of by the simplest of modifications. It is, in fact, only necessary, instead of pouring the emulsion into water, to pour water into the emulsion, and we obtain at once a satisfactory result. There is absolutely no loss, such as follows the opposite proceeding, and the quantity of dried pellicle obtained is fully as large as when the emulsion is allowed to dry before operating upon it. Indeed, the method has some distinct advantages besides that of simplicity, for the dried pellicle is obtained in a totally different and much better form than by the ordinary method.

The mode of operating is as follows:—The emulsion is prepared precisely as usual. When sufficiently ripe—say in twelve or fifteen hours after sensitising—it is to be poured into the bottom of a glass vessel. This vessel must have about ten times the capacity of the quantity of emulsion employed; that is, for eight ounces of emulsion we need a half-gallon jar. The vessel must also be strong, so that it will bear active stirring with a thick glass rod without danger of breaking. (I am particular in stating these points, because if a vessel of insufficient size or a thin glass beaker be employed a satisfactory result will not be apt to follow. Glass vessels of the kind needed may be obtained from any dealer in chemical apparatus.)

Upon and into the emulsion is poured the preservative bath. That which I recommend I have before published. It is the albumen preservative with gum, gallic acid, and tannin, to which in the present case it is perhaps well, though not absolutely necessary, to add a little more acetic acid than the formula directs for dried emulsions. Any other preservative bath, I presume, may be used, provided it be properly acidified, though, as I use exclusively the bath just named, on account of the high sensitiveness it gives and its completely satisfactory action, I can only speak positively for it.

The quantity of preservative should be at least three times the bulk of the emulsion. It is to be poured into the emulsion with constant stirring. At first the mixture seems to make a homogeneous liquid; it is almost as if the emulsion were emulsified into the bath, but presently the solid parts are felt to separate and sink to the bottom. The stirring is to be continued vigorously for three or four minutes. The mixture may be left to rest for twenty minutes, and should then receive another good stirring; then the jar is to be filled up with cold water, stirred again for a few moments, the pellicle allowed to sink, and the liquid is to be poured off.

Less washing is needed in this mode of operating than in the other. The jar is to be filled up with water four or five times, stirring always thoroughly and pouring off close; then the pellicle should soak for half-an-hour, after which the water should be poured on half-a dozen times, always, as before, stirring well and pouring off close. Finally: squeeze the pellicle well with a strong rod, pull it well out, spread it over the bottom of a perfectly-clean porcelain pan, and dry it. The drying may be greatly expedited by folding up a sheet of filtering-paper into a thick pad, and pressing this forcibly against the mass of pellicle brought up against the side of the jar after the water has been as nearly as possible squeezed out of it. This application of the pad should be repeated twice. (Anything which expedites the drying is of importance, because the pellicle is intensely sensitive to light, and great care must be taken to completely exclude every ray. I never would for an instant think of depending upon the darkness of the dark room, but keep the pan closely covered with dark yellow paper. Heat may be applied, and any heat that the hand can bear will not injure the pellicle.)

The pellicle obtained in this way is singularly different from that obtained when the emulsion is dried. It is a fibrous mass, composed

of little strings. It dries much more quickly than the other form—in one-third or one-fourth the time. It also redissolves much more quickly; in fact, a considerable portion of it dissolves as quickly as so much pyroxyline. Nevertheless I prefer to keep it a week before using. I ascertained, some years ago, that there is undoubtedly an action which takes place between silver bromide and collodion, in virtue of which the emulsion changes very much in its nature by standing some days, with occasional shaking; and it is always better to give the necessary time and get the best results. Not, however, that this is essential; on the contrary, I would undertake to take a bottle of sensitised emulsion that has stood twelve or fifteen hours and pass it through all the necessary operations of adding the preservative, letting it stand a sufficient time in contact with it, then wash, dry, re-emulsify, filter, and coat a plate, print a transparency by gaslight, develope, and fix it. I affirm that, as a *tour de force*, the whole of this could be certainly done within a space of two hours, and perhaps considerably less time; but that would not be the best way.

A washed emulsion prepared in this way gives very satisfactory results—not better than those got by drying the emulsion first; but there is considerably less trouble, and this way of operating will probably induce many to make washed emulsions who have hitherto thought the usual method too troublesome. Pouring out an emulsion into a pan, drying it, and then treating it and washing it, &c., seems a troublesome operation to contemplate. It *seems* much worse than it really is, and what trouble it gives is largely compensated by the great facility given for making the plates; but the method here described is so simple and expeditious that it can be hardly objected to on the score of trouble.

The plan of reversing the operation—pouring water into the emulsion—entirely prevents the loss which takes place when the emulsion is poured into water. The product is as large, as I have already said, as when the emulsion is first dried. I have several times weighed the pellicle to test this point. The result in either case varies a grain or so to the ounce, and sometimes the one, sometimes the other, method has given the larger product.

The thin strips of pellicle obtained by this method are exceedingly sensitive to light. If a sensitised emulsion, fully ripe, be poured out on a glass plate, and then be brought out into diffused light, it darkens very slowly; but the pellicle, exposed to the same light, turns black almost immediately.

In re-emulsifying this, just as with the other sort of pellicle, I prefer very much to add fresh pyroxyline to the mixture. Mr. W. B. Bolton thinks this is because I wash the pellicle too soon; but I am convinced such is not the case. In preparing some pellicle by the drying process, recently, I left it, in consequence of other occupation interfering, to become much more thoroughly set than usual. I weighed the resulting product, and found that it was not the least fraction greater than what I usually get. My reasons for adding pyroxyline are quite different. In the first place, as my formula shows, I use a strongly-salted collodion, each two ounces of which make three of finished emulsion. As the pyroxyline in the original collodion is not increased in proportion to the salts, this alone would be a sufficient reason for adding more at the end; but, apart from this, a collodion is always greatly affected by contact with water. A film of plain collodion on glass, after having been washed and dried, is a totally different thing from what it was before. I add pyroxyline over and above that needed by increase of quantity of liquid just mentioned to give strength and solidity; and those who use other processes as well as mine tell me that the emulsions so made are defective from their want of pyroxyline, and that this fault exists also with some of the commercial, washed emulsions.

It may seem singular that a preservative bath containing gallic acid and tannin can be added to a fluid emulsion containing a considerable excess of silver nitrate without reduction and blackening or darkening resulting; but if the emulsion contain the regular two drops to the ounce of *aqua regia*, and the preservative have been properly acidified with acetic acid, the operation presents no difficulty and is perfectly safe. M. Carey Lea.

SENSITISERS AND ACCELERATORS.

The leading article in your last number raises a question of very great interest.

Prolonged investigation into the action of various substances on sensitive films has convinced me that none of those commonly used as preservatives or organifiers are, in any sense, *sensitisers* or *accelerators*.

When the discussion was being carried on between Mr. M. Carey Lea and myself as to the value of the excess of silver advocated by me for use in an emulsion, he went so far as to say that he could exalt the sensitiveness of an emulsion containing ten grains of silver only per ounce to equal sensitiveness with a sixteen-grain emulsion by using a *sensitising preservative*. I tried the possibility of this with every substance that had then been proposed, and in no one case found an increase of sensitiveness. On the contrary, every such substance applied to the exterior of a dry film lessens in some degree its sensitiveness.

I find that you are also strongly of this opinion, and the correctness of the view is indisputable. But you say also that no organic addition to an emulsion can confer any additional sensitiveness thereon. To this I cannot assent, but will not uselessly waste your space in giving you my opinions, even though I can support them with the strongest evidence deduced from experimental work. But, at all events, I may ask you a question. If *you* are correct in saying, "We hold a very strong opinion that the silver haloid itself is the agent upon which depends rapidity, while the organic compounds inseparable from a sensitive film give the necessary density, at the same time behaving more or less as retarders, in no instance increasing the normal rapidity of the film, whether wet or dry," are those writers also correct who say that a collodion emulsion cannot be made to equal the sensitiveness of a gelatine emulsion? As far as I have gone at present with my experiments, a collodion emulsion *can* be made as sensitive as one with gelatine; and the question is, therefore, in my mind, still an open one. A very sensitive gelatino-bromide is to be made by treating it according to Mr. Johnston's formula, and all who are working in this direction should try it; but, at the same time, *unwashed* collodion will equal it.

To return to the question of substances applied to a film: I think they may be divided into three classes—those that give density and vigour with good printing qualities to a negative; those that act as a preservative from atmospheric action and conduce to the keeping qualities of plates; and those that would merely act as mechanical aids to development by keeping open the pores of the collodion film. In the first category I place in the order of their value gum arabic, gelatine, tannin, albumen, giving to gum arabic the first place, as it is far the most sensitive, *i.e.*, has the least retarding effect.

In your Almanac for 1872 I proposed a mixture of gum arabic and tannin, and this combination has lately been advocated by Mr. M. Carey Lea, though his method of mixing does not do justice to the combination, and, were I not unwilling to raise other points of difference between us, I would ask for space to point out how best to use them. In the second category I place gum arabic and gelatine far in advance of any other preservative, both giving good keeping qualities to plates. In the third class I need only mention glycerine, chloroform, castor oil, and such other substances as act only mechanically.

I may mention that in all cases a "preservative" should be acid, an alkaline preservative being a cardinal error. But you will not want more of my opinions, and the temptation to go on writing being great I will close at once. H. Stuart Wortley.

A FEW WORDS ON LACTATE OF SILVER.

In the last number of The British Journal of Photography there appeared a short article by Colonel Stuart Wortley, in which he states, as the result of two years' experience, that the lactate is superior to the malate of silver for emulsion work. I notice this statement with great satisfaction, as I am pleased to find Colonel Wortley has at last come round to my way of thinking.

From an immense number of experiments, extending over a considerable period, I am convinced the lactate is by far the most useful organic salt of silver (as an addition to emulsions) with which I am acquainted; and I have carefully tried not a few. One word in Colonel Wortley's communication might, perhaps, lead to a misapprehension. He mentions the lactate as having been "suggested" by me. Now this might lead a reader to infer I had merely made a suggestion that the lactate might be found useful, without having myself carefully investigated the matter. Such a supposition would be very far from the truth; as, before I recommended the use of lactate of ammonia in a collodio-bromide emulsion, I had already satisfied myself that it was one of the best salts to effect the desired object. Since then I have more keenly appreciated its good qualities, and have ascertained that it is capable of rendering good service, not only in emulsion work, but in other photographic processes, more especially in the collodio-albumen process and in collodio-chloride for printing on glass or paper.

I find from my note-book that in 1871 I was working very energetically at my experiments with lactate and other organic salts of silver, and one or two jottings from that date may not be unacceptable to emulsion workers. It is recorded in this note-book

that the dose of lactate must not exceed certain limits, otherwise it produced precipitation of the bromide of silver; and also that the best time to add the lactate of ammonia to the emulsion was a few minutes after the nitrate of silver.

The formula which has the mark of "greatest merit" against it, and which is the same as the one by which my finest emulsion negatives have been produced, is perhaps worthy of repetition here. It stands thus:—

Bromide of cadmium (dried)	52 grains.
Chloride of calcium (anhydrous)	8 ,,
Alcohol (absolute)	2 ounces.
Powdery pyroxyline	about 40 grains.
Ether	5 ounces.

Each seven drachms to be sensitised with fourteen grains of nitrate of silver dissolved in three drachms of alcohol, and then to have a final addition of five *drops* of syrupy lactate of ammonia. (This would be equivalent to a little over *three minims*, according to a note in my book.) Use in twelve hours or so. After coating, the plates are only to be rinsed in distilled water until the greasy lines are gone before immersion in the bath of preservative. These plates were exceedingly sensitive.

Last year, when my work was suddenly put a stop to by a return of my old enemy, severe rheumatism, I was just engaged in some experiments in which lactate of silver was used in washed emulsions, and the results were most encouraging. As some time may elapse before I am well enough to resume my labours, I hope those who are practically studying the washed emulsion processes will give my friend, lactate of ammonia, a chance.

In collodio-chloride I have found the lactate (very sparing used) of great benefit. It causes the film to give a richer and more velvety image, and entirely prevents that dreadful tendency of the free nitrate of silver to crystallise out in the film, which so many must have noticed when printing on glass by this process.

I must defer speaking of the undoubted value of lactate in the collodio-albumen process, until I am able to give the history of some interesting experiments in which I was engaged in my search after an albumen process which should resemble in good qualities the one worked out by Mr. R. M. Gordon. I have never got over my keen disappointment at Mr. Gordon's leaving the country without divulging his secret. I, perhaps more than most men, had great opportunities of becoming acquainted with the immense value of the process, and have never ceased to wonder at the apathy shown by photographers on the occasion of Mr. Gordon's leaving us. Only thirty-three photographers in the whole world sent in their names in response to Mr. Gordon's liberal offer. It is to be hoped, for the sake of photographic science, that Mr. Gordon will one day place us in possession of the details of his process; and my great wish is that that day may not be far distant.

Next week I hope to write a few words on the use of carbonate of ammonia in the hypo. fixing bath, as first introduced by Mr. J. Spiller, and since strongly recommended by myself and others. I shall also have something to say on tinted films. HENRY COOPER.

NOTES ON PASSING EVENTS.*

BY A PERIPATETIC PHOTOGRAPHER.

I MAKE a present of the following bit of experience to those who are interested in the question of collodion *versus* gelatine. I recently had occasion to visit a gentleman, and found him groaning over an influx of water from the roof of his *sanctum*, by which mishap a certain shelf had become deluged, there being upon this shelf a pile of collodion negatives, and side by side with them a similar pile of gelatine negatives. Both were valuable, and as I entered my friend was in the act of handing them down for examination. "I have no fear for *these*," he observed, pointing to one of the packets, "for they are collodion, and that I know will stand a dash of water without much harm; it is for the gelatine negatives that I feel anxious, as they will have been ruined by the water." Both parcels were opened, displaying the interesting fact that the gelatine negatives were quite as good as ever they were, having been unaffected by the moisture; while of the collodion negatives only one escaped scatheless, all the others presenting a network of vermicular markings which rendered them unfit for future use.

The discovery made by Mr. M. Carey Lea as regards the gelatinisation of collodion by boric acid may eventually become of value. By the admixture of only two grains of the acid per ounce of collodion the latter is converted into a jelly which is insoluble in ether. I have dim, floating visions of sundry methods and processes in which this discovery may be made useful, but it is at present premature to speak of them. But, in the meantime, it would be an invaluable boon to photographers if Mr. Lea would direct his undoubtedly great talents to the investigation and discovery of some agent which, if added to collodion, would have the effect of *preventing* gelatinisation. When to a cadmium collodion a too large proportion of alcohol is added, it is exceedingly prone to jellify to a certain extent; and in hot weather, and under other circumstances in which a preponderance of alcohol is desirable, this proves an unmitigated nuisance.

Those, if there be any, whose aspirations for medals and substantial honours soar higher than those bestowed or donated by the little society in Cornwall, which is the "friend in need" to all would-be bemedalled photographers, will learn with much satisfaction that the Vienna Photographic Society, which has hitherto confined its honours to its own members, is this year to throw them open to all comers. The programme of this Society is not yet published, but if there are any men of sense among them they will avoid falling into the error into which a sapient society (now numbered among the societies that were) in the Scottish capital once fell, viz., giving the brass medals to the inventors and discoverers of processes, and the silver medals to those who worked by means of those processes; that is, brass to the architects, silver to the builders, and (to continue the reasoning) gold to the bricklayers and hodmen! Let us hope that the Vienna Photographic Society will not seek to emulate its deceased female relative in the north in this respect.

Talking of prizes and medals, commend me—in the name of peripatetic photographers—to the Société Photographique de Toulouse, which little fraternity offers medals for the best travelling apparatus of the half-plate size for dry-plate photographers. The camera must be very light and occupy but little bulk when closed up, and the objective be an instrument capable of being adjusted to several foci, by the substitution of one lens for another, while it must be free from complications.

But not alone for apparatus are our foreign friends holding out inducements for improvement—inducement one vainly looks for from the London Photographic Society "as was"—Society of Great Britain "as is." The Photographic Society of France is to give a prize of forty pounds to the best maker of collodion or gelatine pellicle, or, to speak more correctly, of emulsion prepared therefrom. Well, this, too, is a step in the right direction.

* Continued from page 53.

ENLARGING AND ENLARGING PROCESSES.

[A communication to the Edinburgh Photographic Society.]

SOME years ago I heard a good story of a certain retired grocer, who lived in a semi-detached villa on the banks of the Thames. He had a crony who lived in the next villa—an old Indian officer—who, finding the grocer very simple, used to draw the "long-bow" till there was great fear of the weapon snapping. Our grocer, once upon a time, went to hear of the truly wonderful travels and adventures of that pioneer of African civilisation, David Livingstone. Need I say that he came back much disappointed, and with a firm conviction that David Livingstone's life and adventures were tame and insipid compared with those of his neighbour, Major Bang.

Now, in bringing the subject of *Enlarging and Enlarging Processes* before you this evening I am almost afraid that, after the many wonderful *stories* told of enlarging processes, which are to convert photographers who are totally unacquainted with the use of pencil or brush into full-blown artists, chock-full of taste and experience, and of the wonderful productions which are to follow the use of certain formulæ, my remarks (like the life and adventures of David Livingstone to the worthy grocer) may be considered tame and insipid.

The advertised experience of certain photographers reminds me of the advertised cures by Dr. Blank's patent pills. Mr. A. had to keep an artist, at great expense to himself (Mr. A., not the artist), before purchasing Dr. Blank's patent pills. After swallowing the said pills he was enabled to do the work himself and discharge the artist. Mr. B. was afflicted with a first-class printer, with an enormous salary; swallowed Dr. Blank's pills, and now he has better work done by a boy at six shillings per week, while the printer, poor fellow! is wandering about taking views, &c. Photographers must be very gullable if they can swallow *that*.

My aim, in this paper, is to place before you in as plain a manner as possible the results of my experience with the various methods of producing enlargements which I have tried, and the conclusion I have arrived at from that experience.

I will commence with the carbon process. I presume you are all more or less acquainted with the method of producing a transparency from the special tissue supplied by the Autotype Company. Those who are not should read an excellent article in The British Journal Photographic Almanac for 1876, by Mr. Willis, which will give them all the information required. When the original negative is good and the photographer is not an artist, and, therefore, cannot add to the result by a little judicious working, I would advise the use of this method before all others for simplicity and ease of working. It is the only method of contact printing by which the condition of perfect contact is fulfilled. My objections to the use of it are—first, that, in the course of my business experience, I have found that perfect negatives are the exception, not the rule; second, that in nine cases out of ten I can improve or alter upon the transparency where I could not upon small negatives or small transparencies; third, that the sensitised tissue will not keep; and, lastly, that sometimes the exposure is so long that I find it a great waste of time to wait till a carbon transparency is exposed enough when I can get them so quickly in the camera.

I will next take the other methods of contact printing—viz., by means of dry plates—the most successful of which was an albumen process, which was vended all over the country, and the results were undoubtedly very fine. This process can now be purchased for one shilling—either in Mr. Solomon's little work, *Photography in Four Lessons*, or in The British Journal Photographic Almanac, where it is described by Mr. Foxlee. While admiring the really beautiful transparencies which can be produced by this process, I have still the same objections to it as to the autotype process—that it produces small transparencies which it is impossible to work upon for improvement. Another objection is the great trouble involved in the preparation of the iodised albumen. The plates have to be coated with collodion, plunged into a bath of water, well washed, coated with the iodised albumen and dried, then sensitised in an aceto-nitrate bath, washed again, and dried again. If you want dry plates for contact printing which will give as good results as the albumen plates, with much more certainty and considerably less trouble, procure the Liverpool emulsion. Simply flow the emulsion over the plate, stand it to dry, or dry it at once before a dull, red fire, and you have a dry plate which will produce as perfect transparencies as need be. Of course there is still the danger of either the negative or the prepared plate breaking when put together for printing, and in my experience it is ten to one it is the negative. With Mr. Kennett's gelatine emulsion I have had very little experience, and that little was certainly not favourable to it.

I now come to the method by which the pictures before you were produced. In giving details I do not say dogmatically this is the best possible method of making enlargements. I show you certain results; I say I arrive at such results by such and such means. Another man may produce results by other means which may be better; but I say, most emphatically, that by no means whatever can any man produce good results without experience, careful study, and brains. Whatever process may be adopted you may be sure that you will only succeed by sticking to the old school motto—"Try, try, try again!"

I make my transparencies upon $8\frac{1}{2} \times 6\frac{1}{2}$ plates, thus enlarging half way. Sometimes I make them the full size of the enlargment needed. Then the negative is either made by the autotype process or upon paper, as described by Mr. Blanchard before the London Photographic Society; but the ordinary run of work is done upon whole plates, the old collodion and bath process—in other words, the wet process—being used. Before going further let us take the objections urged against this method. The most important is that collodion, not being a structureless film, is unfit for enlarging from. Now, how does this objection stand in regard to the other processes which have been held superior to it for that reason? The autotype process commences with a substratum of collodion to develope the tissue upon. The albumen process does the same. Now, if the objection were valid, it would apply more to those processes, because the structure of the collodion would be enlarged from the quarter-plate transparency, instead of, as it is in my practice, from the whole plate. The fact is there is no structure in good collodion if it be worked right. Of course, a sample which showed crapes or other markings would be as unsuitable for enlarging as it is for any other work. I am now making my own. You will find the full details in the *News* "Year-Book." You will find a mixture of equal parts of Mawson's and Huggon's collodion the best for the purpose. The method of using an enlarging camera is, of course, known to all. I use my dark room as a camera, a hole being made at one end, with a mirror outside to reflect through the negative. The first advantage I found in the use of an enlarged transparency is the ease with which it is focussed sharply. The exposure will, of course, vary with the light, density of the negative, &c., but always expose fully. It is the under-exposed, forced-up transparencies which give coarse texture. Develope with iron eight to ten grains per ounce, with the same quantity of acetic acid. Do not stop the development when the picture appears right, looking *at it.* It must be carried on until all details are fully out. When looked *through* every part should be covered with deposit except the highest lights. I have forwarded one or two transparencies that you may see what I aimed at. When fully developed wash well and fix, and strengthen at once, or you can let them dry and strengthen after; *in no case can this be omitted.* Take bichloride of mercury half-an-ounce, water twenty ounces. To one drachm of this put one ounce of water, and flow on and off the transparency till the blue tone it assumes at first is changed to a deep brown. Then wash off and allow it to dry, when it must be varnished, and when this is hard it is ready for the pencil.

I know there are many members of this Society who have from the first consistently argued against the use of the pencil for retouching or "improving" negatives, and with good reason when it is made use of to the extent which is sometimes practised; but I must say that, no matter what process of enlargement be adopted, the pencil must be used at some stage of the process if the public are to buy the pictures. Although a deal has been written about elevating public taste, I fail to see how that is to be done by offering photographs (enlarged or direct) which fail to do justice, by reason of the exaggerated defects, due entirely to the fact of photography being unable to reproduce colours in their proper relation one to another, as seen by the human eyes. These defects are of necessity much exaggerated by enlargements, therefore some kind of working is absolutely necessary for the production of an enlarged picture which shall not be offensive but truthful; but it must be done with knowledge and discretion. You will see by the transparencies before you that there is not much work done to them, but what is done is with the intention of adding to the gradations, and the deepening of certain parts which are required to give depth in the finished print.

Bear in mind that every touch put upon the transparency will appear upon the print in its proper shape as a dark touch—not reversed, as in a negative. In retouching, the parts which require looking to are—the pupils of the eyes, the line of the lash, the nostrils, the upper lip, and perhaps the hair and portions of the drapery may be deepened. Only light breaks or spots upon the face should be touched, and if some shadow should end too abruptly its edge can be softened into the light, providing care be taken that the shape of the shadow is not altered. If this have been done with care the transparency will be greatly improved, and can now be used for making the negative. If the transparency have been made the full size of the enlargement required it can be used for the production of a paper negative, as described by Mr. Blanchard. A piece of ordinary sensitised albumenised paper is put in contact with it in a printing-frame and a negative printed off, which should be fixed without toning. It can be waxed, which, in my experience, is better than using it without. Here is one of these paper negatives, from one of the transparencies you have seen, with a print made from it. It is slightly damaged by being doubled up, but it will enable you to judge of the effect of this method.

If the transparency has been made half the size it must now be put in the place of the original negative, and a negative made from it in the usual way, by the wet process, the size required. Here I will mention one fact which I think a great advantage. If you have made your transparency by either of the methods of contact printing you have to make your enlargement by one operation, and in exposing for a large negative made from a small transparency I find the exposure at least three times as long as it is for the same size negative made from a transparency half-way between the original negative and the enlargement required. This is a great consideration in dull weather.

Having made our enlarged negative I come to the method of finishing it, which I do with some hesitation; for, in the warm discussion just closed I feel I was placed in a very false position. I was treated as if I had robbed M. Lambert of *his* process, when the facts prove just the contrary. In the discussion the main fact was entirely overlooked, and various writers strained to show that M. Lambert's method of making the enlarged negatives was entirely different to mine. That I do not deny, nor does it touch the root of the matter at all. M. Lambert has not patented a method of enlargement. He has patented the use of semi-transparent paper upon both sides of the enlarged negative, and *it does not matter by what process that enlarged negative may have been obtained.* He claims to prevent any that are not licensees using the tracing-paper in the way mentioned. Now, fortunately for photographers, I have ample proof of priority of publication and use. In August, 1873, I

made an enlargement of the late Emperor Napoleon III. for the Stereoscopic Company, which was finished upon tracing-paper strained upon both sides of the negative. This negative and others were seen in my studio by many photographers, who came to me for lessons, and by many of my personal friends. Directly afterwards I sent three enlarged pictures to the exhibition of the London Photographic Society, all three done by different methods, which I described in a letter to the judges. One of the three pictures—the head of a boy, 20 × 16—was produced by this method, and I have great pleasure in submitting it to you. The negative with the double covering was exhibited at a meeting of the South London Photographic Society, when I read my paper in December, 1873. It unfortunately got broken whilst carrying it home after the meeting, or I would have exhibited it also.

I have entered thus far into details to prove to you that, in spite of advertised threats to the contrary, every photographer is at liberty to use the method I am about to describe, although it is covered by a patent taken out in 1874; but, in doing so, I do not wish for one moment to depreciate M. Lambert's efforts as an instructor in various useful dodges. Anyone can learn more from seeing another person work who is well up in what he professes to teach than they could from pages of written description; but I must protest against the insinuations of unworthy motives so freely hurled against me, when the fact is I have freely published everything I know which I have thought would be of use to my professional brethren—sometimes to my own loss commercially; and I could not stand by and see the method I had given to the profession coolly taken possession of, more especially as I was told that I should be prevented from using what I had myself devised. As that threat has not been carried out, I suppose they did not find the ground quite so safe as was expected.

I have here a 20 × 16 negative which will explain itself much better than I can in writing. The enlarged negative not intensified is varnished, and any transparent spots having been removed with a brush and water colour (Payne's grey I find best for the purpose), it is covered, back and front, with tracing-paper. This is done by slightly damping the tracing-paper and running a thin edge of gum round the negative; when dry it will be as "tight as a drum." Now, upon the face side fill up any little breaks or inequalities with an "H.B." or "H." pencil, working upon the tracing-paper. In the hands of an artist here is a great power for improvement. Observe upon the negative how the pencil has gone over lace, jewellery, &c., bringing up high lights and graduating shadows. Should any touch be too heavy it can be softened with a touch of cotton-wool. Should broad masses of light be necessary they can be put on with a tuft of cotton-wool and blacklead in powder, which has been mixed with an equal quantity of putty powder; but the masses of light are best put on on the reverse side. Great care is necessary not to cover up any of the delicate half-tones; but with care and knowledge a vast amount of improvement can be effected upon the reverse side, because, being the thickness of the glass from the sensitised paper, the working is softened. The danger to guard against is that the decided lines and shadows are not softened *too* much. Any amount of local intensity can be given by the help of the mixture of blacklead and putty powder, while any false touches or portions of the powder which may have gone over shadows can easily be removed with a piece of bread or india-rubber. For instance, should a face print too quickly for the drapery an even tint can be rubbed all over the paper, covering the face *upon the reverse side*, the high lights upon the forehead, nose, cheek bone, and chin strengthened with a "B.B." pencil, while, if the face be flat and wanting in roundness, the powder can be removed with a piece of soft ink-eraser cut to a flat point. It is wonderful what a difference can be made by clearing off the powder from the eyebrows and eyes, the shadows under the nose and chin, and, if required, from the shaded side of the head if the face should be very flat.

You will see by the negatives before you that I mask my background in the same manner, but I use soft pastel instead of blacklead. I take black and lake, and mix well with one-third its bulk of powdered pumice stone. This is rubbed on with the finger, and I have found nothing better for masking out any part of the picture that may require it; the edges are quite sharp enough, and yet they are soft. You will also see that I only resort to the double paper for negatives over 12 × 10; for that size and under I prefer to work with the pencil upon the varnish on the front or film side, while I mask out and work on the broad masses of light upon tracing-paper strained upon the reverse side. By comparing the enlarged transparencies with the negatives, you will see how little touching is needed upon the negative if the transparency have been mended properly. With larger work more touching is necessary; therefore, I use the double tracing-paper as upon the 20 × 16 negative.

All the prints before you, except the 17 × 12 mezzotint, are untouched, including the 20 × 16 of the boy in a frame, which has only had the white spots stopped out. The others, you will see, have not had that done, as I wished you to see the results as they came from the negatives without after-manipulation, that you may judge for yourselves if there be any work wanted upon them, beyond simple spotting, to make them fit to be seen. The framed mezzotint is one of the two exhibited by me at the late exhibition of the London Photographic Society, which the *Morning Advertiser* classed next to the direct pictures of M. Hugo Theile, of Dresden, for softness and effective distribution of light and shade. This, coming from an independent daily paper, is a compliment of which I am not a little proud; for not long since it would have been rank heresy to mention enlargements in the same breath with direct pictures. It also shows what can be done by a process which has been condemned as old-fashioned and unsuitable for the production of first-class work. The results are before you, and the method by which they were produced I have endeavoured to describe so that anyone with average ability may succeed with it. It is not a process by which any ordinary photographer can be made to produce artistic pictures without himself possessing artistic knowledge; but it is like any other process, either in photography or out of it. Patience and skill will always succeed, and the best man will win.

G. Croughton.

FOREIGN NOTES AND NEWS.

The Illustration in the Bulletin of the Belgian Association. —Another Photographic Prize.—French Difficulties in Emulsion Work.—M. Liebert's Prize.

The last number to hand of the *Bulletin de l'Association Belge* presents as its monthly specimen an admirable proof by the Woodbury process. The subject is *A Devonshire Cottage*, and is from a collodio-bromide negative by Mr. W. B. Woodbury, who also supplied the prints. It is the same subject as the chromo Woodburytype that furnished the theme for an article in this Journal a few months ago, and which now hangs on the wall of our editorial office, and it affords, in our opinion, the finest example of photo-mechanical printing yet published by our enterprising Belgian contemporary, whose editor thus speaks of it:—"We may be permitted to call the reader's attention to the delicacy of this magnificent proof; the details in the foliage, the moss upon the thatch of the roof, are all so clear and fine that one is led to believe it a miniature rather than a photograph from nature."

We are happy in being able to announce that, in consequence of the generosity of an anonymous benefactor, the Belgian Photographic Association are in a position to follow the example of the Photographic Society of France in offering a prize for the best rapid dry process. The prize will consist of a gold medal of the value of 500 francs, and will be awarded to the process which shall approach most closely to the conditions laid down by the committee. These are set forth in the second article of the published announcement, which runs as follows:—"The committee consider that the best process should be that which, by means of an easy preparation, gives the most uniform and regular results combined with as great as possible a degree of sensitiveness. Facility of development and fineness of the image produced will also be taken into consideration." The remaining conditions are similar in spirit to those already published in connection with the French prize. The competition will close on the 31st December, 1876, previous to which date all packages must be addressed to the *Secrétariat Général de l'Association Belge de Photographie*, 44, Rue de Namur, Brussels. The Association will acquire the right of free publication of the complete details of the process which may be awarded the prize, but of no others without the consent of the owners; after which the process will be given freely to the public, to be worked commercially or otherwise by any persons who may feel so disposed.

M. Champion and another member of the Photographic Society of France, having experimented with Mr. M. Carey Lea's chlorido-bromide process and only partially succeeded, suggested, at a late meeting of the Society, that Mr. Lea should be requested to give more fully-detailed instructions as to the working of his method. M. Champion alleged that he had been unable to notice that the preservative recommended produced any insoluble precipitate with the free silver contained in the emulsion; hence, that the effect of such preservative must be entirely removed by the subsequent washing. He argued from this that the result would be similar to *washing off the preservative from an ordinary collodion plate.* He

had also found that drying the pellicle at the temperature spoken of by Mr. Lea produced insolubility of the product in ether and alcohol, and that plates prepared with pellicle thus dried gave, even after a very long exposure, no trace of an image. The other gentleman had found it impossible to remove, by means of the most prolonged washing, the last traces of the preservative, which conduced to complete insensitiveness. He had then tried washing the pellicle previous to the application of the preservative, when, after an extremely long exposure, he had been able to secure a very poor image; the film, in the latter case, being dead and sadly retentive of any particles of dust which might become attached to it. After these communications, it was decided to appeal to Mr. Lea for further details. Surely, in view of the approaching competition—in which, we may rest assured, emulsions will take a prominent part—our French *confrères*, with whom will rest the decision as to the respective merits of the various competing processes, ought to bestir themselves and become better acquainted with the working of a description of plates with which at present they appear to be but little familiar.

The conditions agreed upon by the committee appointed for that purpose, in connection with the competition for the prize of 500 francs offered by M. Liebert, decree that it shall be awarded to the inventor of a process which shall diminish to at least one-half the time of exposure in the camera, while giving negatives equal, if not superior, to those obtained by the ordinary method. The process must bear upon the materials or their preparation, and not upon the apparatus. These preparations or manipulations must be of a practical nature, sufficiently easy of application to be within the reach of all, and to be capable of ordinary use. The competition closes on the first of November next.

Meetings of Societies.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.

The usual meeting of this Society was held on Tuesday last, the 8th inst., in the premises recently acquired for holding the meetings, viz., the Gallery of the Society of Painters in Water Colours,—Mr. Glaisher, F.R.S., presiding.

It was announced that the Council had elected M. Davanne, Vice-President of the Photographic Society of France, and M. Rommelaire, Secretary of the Belgian Photographic Society, as honorary members.

The following new members were elected:—Mrs. Price P. Baly, Lieut.-Colonel Bagot, and Messrs. W. B. Clifton and J. T. Taylor.

The Chairman having made some observations respecting the objects of the Society,

The annual report of the Council was then read and adopted, together with the Treasurer's statement. These (which we hope to publish next week) showed an unexampled state of prosperity.

Votes of thanks having been awarded to the officers of the Society, the Secretary read obituary notices of Sir Charles Wheatstone, Mr. Vignoles, and other deceased members.

Mr. Hooper expressed his agreement with a good deal that was in the report, but considered there was a great lack of novelty in most of the papers that had been read during the past year. He alluded to the reception given to a paper he himself had read, and which was denounced by a member of the Council by whom it had been passed, and he thought that the Society ought to have secured the services of such eminent lecturers on light, optics, and cognate subjects as Professor Tyndall and Mr. William Crookes. Communications should also have been invited from MM. Vidal, Hermagis, and others who had introduced novelties. Phototypography and photographic engraving had also been neglected, and these, he thought, should receive the notice of the Council.

The Chairman said that there was no chance whatever of any of the lecturers on light and optics named bringing before them the results of their discoveries so long as there was a Royal Society ready to receive such communications, but he hoped that Mr. Hooper would himself contribute useful papers on novel subjects to them during the year then commenced.

Mr. Warnerke then read a paper *On Investigations on Gelatinised Pyroxyline, and on Haloid Salts in Emulsions.* This will appear in our next number. The discussion was postponed till the subsequent meeting, when the subject will be re-introduced by Colonel Stuart Wortley.

Several speakers adverted to the value of the researches detailed in the paper, and the Chairman conveyed the thanks of the Society to Mr. Warnerke. The scrutineers then gave in their report on the ballotting papers sent in in connection with the election of officers and Council in place of those retiring by rotation. The completed list is now as follows: —*President:* J. Glaisher.—*Vice-Presidents:* J. Spiller, V. Blanchard, and Professor Stokes.—*Council:* F. Bedford, W. S. Bird, J. H. Dallmeyer, T. S. Davis, W. England, R. J. Friswell, Samuel Fry, Frank Howard, Jabez Hughes, Major Malcolm, H. B. Pritchard, W. J. Stillman, Capt. Abney, W. Bedford, Dr. Diamond, Lord Lindsay, G. W. Simpson, and Colonel Stuart Wortley—the last six being the newly-elected members of the Council.—*Treasurer:* R. W. Thomas.—*Hon. Secretary:* R. J. Friswell.—*Assistant Secretary:* E. Cocking.

The next meeting will be held at the same Gallery, on the 14th March.

EDINBURGH PHOTOGRAPHIC SOCIETY.

The fourth ordinary meeting of this Society was held at the Hall, 5, St. Andrew-square, on the evening of Wednesday, the 2nd inst.,—the President, Dr. Thomson, in the chair.

The minutes of the previous meeting were read and approved, and Mr. J. Duncan Gall was admitted an ordinary member.

Dr. John Nicol, the Corresponding Secretary, read a paper, by Mr. George Croughton, of Lowestoft, on *Enlarging and Enlarging Processes* [see page 66], which was illustrated by a collection of very beautiful specimens showing the various steps of the operation from the *carte-de-visite* original to the finished 20 × 16 enlargement, and all of which received a large amount of well-merited praise. At the conclusion of the paper,

The Chairman said their warmest thanks were due to Mr. Croughton for the very interesting paper that had just been read, and for the opportunity he had afforded them of seeing the beautiful specimens by which it was illustrated. He quite agreed with Mr. Croughton in thinking that the positives or transparencies were much better made in the camera than by any method of superposition, and was sure that, under ordinary circumstances, the former method was more likely to give the full amount of detail contained in the negative. His own experience of enlarging was so limited that he did not consider himself competent to speak as to the merits of the various methods by which that work might be done; but he was able to form an opinion as to the results which Mr. Croughton had produced, and he thought they bore ample evidence of his ability and skill. While he had no doubt that a suitable process was a most essential thing in any kind of work, he was equally certain that by no process which might ever be invented could anything approaching such high-class work be produced unless it was directed by a talented mind imbued with the requisite art feeling. From an examination of some of the negatives sent by Mr. Croughton he could see that the method of straining paper on both sides gave the artist a greatly increased facility of working out his effects; and he thought there could be little doubt that the evidence showed clearly enough that Mr. Croughton had so used paper, both in private and in public, prior to the date of M. Lambert's patent.

Mr. Ross said that the members were deeply indebted to Mr. Croughton for the opportunity of examining a collection of such extremely beautiful pictures, and especially for sending with them the transparencies and negatives from which they had been produced. From even a slight examination of such fine work in all its various stages the most experienced amongst the members could not fail to learn something. In common with many others he frequently had doubts as to whether the camera or superposition was the better for the production of the transparencies; but within the last few days he had felt quite satisfied that the former gave a softness and delicacy which could not be obtained by the latter method. Mr. Croughton's mode of making $8\frac{1}{2} \times 6\frac{1}{2}$ transparencies gave greater facilities for the necessary retouching, which, when judiciously done, undoubtedly improved the enlargement; but, while admitting that, he felt constrained to say that in too many cases the retoucher aimed at producing pretty pictures rather than honest truth. Such an observation, of course, did not apply to Mr. Croughton, who, by the specimens on the table, had proved himself a workman that need not be ashamed of his work.

Mr. Bashford said that he was very much pleased with the specimens, which were very beautifully done. He had used a good hundred feet of the transparency tissue in the production of transparencies; but he should never use it again, and would not advise anybody else to do so. He had a large number of transparencies made with it, from which he would defy any man to make good negatives. If anyone wished to make transparencies in that way he could cordially recommend the special portrait tissue, "brown tone," which would be found all that could be desired. To those who wanted perfect transparencies that could not be improved he would strongly recommend the beer-and-albumen plates. He had recently got a few of them from Mr. Matheson, and the results were simply perfect. He might say that for years he had been in the habit of making large-sized transparencies—frequently, indeed, up to the full size required—and he had from them made paper negatives, as had been recently suggested by Mr. Blanchard.

Mr. Tunny thought Mr. Croughton's paper very seasonable. While of much value to all connected with enlarging he thought its main point was the way in which it dealt with the question raised by one of M. Lambert's patents, as to whether photographers were entitled to use paper on both sides of a negative. This was a point of considerable interest to members, and it was only right that on such a question they should give expression to their opinions. For himself, he was quite satisfied that Mr. Croughton had a prior claim to that useful method of working on negatives; and, as he had freely given it to the world, the claims of M. Lambert could not be substantiated. He did not grudge M. Lambert the great success he had gained in the introducion of his methods of working; and he had no doubt that those who had been

taught his extremely beautiful method of manipulation would find that their money had been well spent. With the exception of the use of paper on both sides of the negative, the methods adopted by M. Lambert and Mr. Croughton were very different. M. Lambert began with a transparency the size of the original negative; Mr. Croughton made one of $8\frac{1}{2} \times 6\frac{1}{2}$. The latter strengthened his transparency; but M. Lambert did not. While Mr. Croughton made a strong, dense negative, M. Lambert kept his as thin as possible, trusting to get sufficient density by the plumbago applied to the paper, with which the front and back were covered. They could all judge for themselves of the beauty of the results obtained by Mr. Croughton; and he could assure them that he had seen at least one picture, by one of M. Lambert's pupils, that was perhaps the finest piece of work he had ever examined. He quite agreed with Mr. Croughton that it was nonsense to say that anybody could by either method of working produce fine results. The results depended not so much on the process as on the talent and ability of the artist; and the pictures on the table showed unmistakably that Mr. Croughton was a manipulator of the highest order. He thought the members were very much indebted to Mr. Croughton, both for his admirable paper and the beautiful specimens by which it was illustrated.

Mr. W. Neilson said it was well known that he was no advocate for enlargement; but he could not help saying that Mr. Croughton had contributed an admirable paper, and backed it up by some really fine specimens that would do credit to anybody. Referring to the question of the right to use paper on both sides of a negative, he said that sixteen years ago, when hard negatives were the rage, he had used that method of manipulation to soften and remove the violent contrasts that were so disagreeable in some of his work.

Mr. Turnbull had tried the ordinary transparency tissue, and could not get it to work satisfactorily; but he succeeded very well with the special portrait tissue recommended by Mr. Bashford.

Mr. John Lessels, architect, then read a paper entitled *Notes for a Short Tour in Belgium, with the Camera.* [Owing to severe pressure on our space we are compelled to defer the publication of this paper till next week.] As, however, the hour was late the reading of the paper was not followed by any discussion. It was illustrated by a number of fine photographs taken both by himself and the Vice-President, Dr. Sidey, and which were much admired.

The report of the Council regarding the proposed exhibition was then considered. It was resolved that the Society should hold a photographic exhibition in December, and that the necessary steps be taken to invite contributions from all parts of the world.

A distribution of pictures, contributed by Mr. Crighton, was then made by lot in the usual way; and, after hearty votes of thanks had been given to Mr. Croughton, Mr. Lessels, and Mr. Crighton, the meeting was adjourned.

Correspondence.

February Meeting of the Photographic Society of France: Reception of The British Journal Photographic Almanac; a New Instantaneous Slide; M. Carette's Cameo Screens; M. Vidal's New Negative Photometer; Preservation of Photochromic Proofs.—Ministerial Visit.—Promise Made to The British Journal of Photography by M. Vidal.—Substitute for Ground Glass.—Photo-Engraved Proofs by M. Rousselon.—On M. Boivin's New Process.—Artificial Coloration of Trees.

The Photographic Society of France held its monthly meeting on Friday evening last, the 4th inst.,—M. Peligot in the chair. A gloom was thrown over the Society by the unwelcome announcement that their esteemed President, M. Balard, was dangerously ill.

After having read and discussed the correspondence, the Secretary presented to the Society The British Journal Photographic Almanac for 1876, and gave it such a hearty welcome as would not only repay its Editor for the great pains bestowed upon this annual volume, but also gratify the numerous contributors in hearing the opinion bestowed by that gentleman upon their articles and suggestions.

M. Darlot, the well-known optician, presented a lens with a new instantaneous shutter or, rather, slide. The idea is novel, and it is rather strange that it should not have presented itself before; perhaps it escaped observation on account of its simplicity, for the mind of man has rather a tendency to seek for difficulties than otherwise. M. Darlot, I believe, has the honour of being the first in France, if not elsewhere, of superseding the heavy and inconvenient apparatus generally attached to the front of the lens, and replacing it by a simple steel slide, which enters into the well-known slit between the two lenses made for the admission of the Waterhouse diaphragm. This slit is only made at the top of the lens; but M. Darlot has made a corresponding one at the bottom, so that a piece of thin steel about five or six inches in length, with a hole in the centre, can slide through with ease. In order to operate after having focussed it is only necessary to raise the slide as high as possible; it is maintained in this position by means of a catch. When this catch or spring is pressed it falls *à la* guillotine. The image is cast but for a moment on the sensitised surface; this length of exposure can be regulated by having two or three slides with different apertures. Shaking of the camera need not be feared, for the steel slide slips through its brass guides without causing the least vibration, and the shock is imparted only when the slide arrives (let it be said) home, and when the light has been completely shut off.

M. Carette, manufacturer of chemical appliances, &c., presented to the Society a series of Bristol frames for the impression of carbon tints on vignetted portraits, &c. This cameo screen is very light, and will render service to amateurs who have not a large number to produce; but for the profession it cannot replace the solid cameo screen frame presented by M. Liebert to the Society in the month of August last, and of which I spoke at page 392 of The British Journal of Photography.

M. Léon Vidal made a gift to the Society of his new photometer, which he employs to judge of the time of exposure in a studio or elsewhere. I am certain that this new negative photometer will render service to amateurs and others in estimating the intensity of the light when exposing dry plates. Naturally, judgment and skill must be employed when using this mechanical means, or it will be more than useless; for if an amateur, in taking a distant view of a landscape, expose the same time as for a white house which fills up the whole plate, presuming that the photometer indicated that the photogenic power of the light was the same, no doubt he will reap the reward due to his inexperience, and must commence again. But to a person acquainted with outdoor work, and able to take into consideration how the different objects are lighted, and the quantity taken up by the lens and thrown upon the sensitised surface—such an one would gain great benefit by employing this photometer, especially if he discovered that it was necessary to change the diaphragm; the tables of M. Vidal would inform him immediately how much more or less he must expose his plate. This photometer is very convenient to carry, folding up into the shape of a pocket-book, and weighs only two ounces. When opened a frame of tints are seen rising in depth from one to ten. In the centre of each tint a hole is punched, through which may be seen the paper prepared by chloride of silver, which is used as in the photometer of the Autotype Company—with this difference: theirs give only one tint, whereas that of M. Vidal gives ten distinct tints. In order to employ this photometer a small piece of sensitised paper is put upon a slide, which slips up and down in the book under the ten holes of the tints. To make the observation, the operator stands with his back to the sun and his watch in his hand. The book is now opened and held about eight or nine inches from the body, so that the shadow of the head, if possible, may fall upon it. The photometer is sustained in that position for the space of sixty seconds. The operator then compares the tint, and on looking at the table can see immediately the time he must expose with such and such a diaphragm, and from a two-inch to a three-feet focus. A skilled operator would have to make only two or three observations during the day; but, if necessary, twenty-five can be taken, and even more.

M. Vidal seized the occasion to lay before the Society a great number of proofs of his new process of photochromy. Many were much admired; and it is now proved beyond doubt that this process has become a very successful commercial enterprise.

Having received many letters from the readers of The British Journal of Photography asking for information, &c., I made it an agreeable duty to pay a visit to the new establishment which M. Dalloz had constructed for the carrying out of this process. I had the pleasure of arriving at the same moment as M. Wallon, the Minister of Public Instruction. MM. Dalloz and Vidal did the honours of their splendid and well-arranged establishment, showing the numerous specimens of photography in colours unaided by any brush whatever. The "Ministre" then examined in detail the new machines lately constructed for the production of the photochromic proofs. M. Vidal explained to the Minister the great advantage which art and science would reap in employing the new process of photochromy for the reproduction of models, paintings, and works of art in our museums, and what a benefit to public education it would be to popularise marvels of every description, as proofs could now be printed off in unlimited numbers, so that every small town or village could, at a very cheap rate, be in possession of the reproduction of all objects to be found in the museums of Paris and elsewhere, and by so doing creating in the inhabitants a love of learning and art.

The Minister acknowledged the value of the discovery and the usefulness of the invention; and, promising M. Dalloz that every facility should be given to him to make reproductions of everything contained in the public museums, he retired, congratulating M. Vidal on his efforts having

been crowned with success, and M. Dalloz for the great activity which reigned throughout every part of his immense establishment.

In taking leave of M. Vidal, and at my request, that gentleman promised he would send me some specimens of photochromy, to be forwarded to the office of THE BRITISH JOURNAL OF PHOTOGRAPHY, so that the readers of that publication might be in a position to judge of and appreciate his invention.*

M. Preval, operator to M. Davanne, has discovered a method by which he can give common glass the appearance of ground glass. Everyone accustomed to field work knows how disagreeable it would be to meet with an accident by which the focussing-glass was broken; only those who have met with such an accident can appreciate the trouble and vexation it has caused. M. Preval gave the formula to the Society, which is as follows:—Take 100 drachms of water, in which dissolve ten drachms of gelatine; filter, and, when slightly warm, add four drachms of starch, and boil it for three or four minutes, in a manner similar to making paste. This is poured upon the glass, and when dry it presents the appearance of finely-ground glass. If the glass have been previously cleaned with a little French chalk, the pellicle can be taken up off its support, so that several of such films may be taken on a tour in anticipation of an accident. It is, indeed, a rare circumstance that a glazier cannot now be found in any small town or village who would cut a piece of glass the required size, which, being roughly cleaned, might serve as a support to the pellicle. The glass plate is plunged into a water bath, then the pellicle; the glass is slowly raised to the surface bearing the pellicle, allowed a few minutes to dry, and is then ready for use.

M. Rousselon, manager of the celebrated firm of Goupil and Co., made a presentation to the Society of a collection of photo-engravings representing the pictures in the last exhibition of paintings. Admiration was not wanting, and praise was liberally bestowed upon him who had turned such *chefs d'œuvre* out of his hands. Indeed, I must frankly own that I have never before had the pleasure of examining such a magnificent collection. It can be said that the artist has surpassed his colleagues; each proof is a masterpiece of chemical as well as of mechanical art, and furnishes abundant evidence that the great reputation and success which M. Rousselon has attained is but the just reward due to his intelligence and perseverance.

The conversation of the evening then turned upon the supposed new process of M. Boivin, which the author says is a complete subversion of the actual wet process. He proposes to introduce the silver salts into the collodion, and to sensitise in a bath of iodide and bromide salts. Now I have quite forgotten the name of the gentleman who proposed this method years ago, and should be happy if any of my readers would enlighten me by a note to the Editors on that subject; for honour should be given to whom honour is due. For dry-plate work M. Boivin operates in the same manner, and finishes his plate by a method not unlike that employed by Taupenôt. One advantage can be stated, namely, that the dry plates can be prepared in full daylight, as the iodide of silver formed in the film is completely insensible to light in the presence of an excess of iodide. But a great inconvenience is that plates so prepared must go through a nitrate of silver bath to render them sensitive to actinic rays, which inconvenience, in my mind, more than counterbalances the slight advantage of working with a white instead of a yellow light.

It appears that, ere long, we shall be able to have all our furniture—even articles of common deal—of such a beautiful colour as to throw out of fashion the mahogany and other foreign woods which have held sway so long amongst us. A French gentleman has discovered a new method of compelling, as it were, the tree to colour itself. He operates upon it at the moment when the sap is rising after its winter's repose to give life and vitality to the branches. He introduces a chemical into this vivifying agent, and, behold, it distributes the colouring composition through every pore and fibre of the tree! When the coloration is terminated the knots and veins contain such a multitude of shades, harmonising one with the other, that furniture made of it has at once a strange and fascinating appearance. I believe trials were made in England in order to obtain the same result, but without success, as the colour obtained faded in a very short time. All honour be given to those who seek to endow their country and the world with a new invention! The country gardener who lately discovered the means to cultivate potatoes all the year round in the open air (see THE BRITISH JOURNAL OF PHOTOGRAPHY, vol. xxii., page 417), and so dotted the world with new potatoes on new year's day, has done more to benefit France than all the battles gained by Napoleon. E. STEBBING, *Prof.*

Paris, February 7, 1876.

* This will be much appreciated by numerous readers, for we are repeatedly asked if we have not any specimens of M. Vidal's polychromes for exhibition.—EDS.

THE CONVERSION OF BROMIDE INTO CHLORIDE OF SILVER.

To the EDITORS.

GENTLEMEN,—In your last week's issue Mr. Berkeley states that he has tried to convert bromide of silver into chloride by the application of chlorine water, and has got no result. As I used to be in the habit of converting the bromo-iodide and bromide of silver in a film into the chloride by this method, I cannot quite understand the negative results he has obtained.

Let Mr. Berkeley try this experiment:—Coat a plate with bromised collodion and sensitise (or use an emulsion); wash, and place half of it in a dish containing freshly-made chlorine water for ten minutes; then wash again, and apply ammonia. He will find that the salt of silver dissolves away where it has been in contact with the chlorine water, whilst the other portion remains nearly intact. He will also find that iodine will displace bromine. These results may affect the argument in his letter.—I am, yours, &c., W. DE W. ABNEY, *Capt.* R.E.

Rochester, February 8, 1876.

CANON BEECHEY'S PROCESS—ALBUMENISING, KEEPING, STAINING, AND COMPLICATING DRY-PLATES.

To the EDITORS.

GENTLEMEN,—I shall always take pleasure in replying to inquirers as to my simple process, either through the Journal or by private letter.

1. I do not think it matters much whether albumen or gelatine be used to render the plates adhesive. I think the former less inclined to blister; but, as when I wrote I thought the alternative lay between the white of a fresh-laid egg (which it is not always easy to get, and which makes a great deal more solution than is wanted, and which will not keep) and a few (five) grains of gelatine, which can always be had fresh and leaves no waste, I gave the gelatine formula the preference. Since writing the article I have seen and got Thomas's dried albumen or pure white of egg, which is greatly preferable to either; I now use this in the proportion of three grains to the ounce.

2. The second question I have already answered in the Journal. I believe both the chloro-bromised collodion and the sensitised emulsion will keep as well as any; but I cannot too strongly recommend amateurs, who use comparatively small quantities, to keep, as *stock*, only the chloro-bromised alcoholic solution, and to dissolve their gun-cotton (in no greater quantity than they require for the number of plates they mean to *expose*) at the same time as when they are preparing to sensitise it for emulsion.

3. I am quite sure that "staining" greatly injures every emulsion. The very principle of my process is to keep it as *simple* as possible, avoiding all other elements, except acid chloro-bromide of silver. "D." will find that these plates require neither staining nor backing.

4. I have been strongly urged by my friend, Colonel Stuart Wortley, to try the addition of sulphuric acid. To please him I certainly mean to do so in better weather, and I will report the result; nevertheless, for two reasons, I do not recommend it to "D.":—First, because sulphur in every shape has hitherto been the bugbear of photographers—

"Sulphur, a monster, frightful in its mien,
That to be hated needs but to be seen;"

and, therefore, I cannot recommend it until, perhaps—

"Yet seen more oft, accustomed to its face,
I first endure, then pity, then embrace."

But, principally, because I do consider it the very bane of all excellence in amateur photography to be always recommending something new before what was recommended yesterday as the perfection of dry plates has had anything like a fair trial in practice and experience. It does shake one's confidence in any process when its loving father of to-day only holds it up as the finest child in the world to snub it, and send it up into the nursery, in order to toss up and display his darling offspring of to-morrow as the sweetest and most promising baby ever seen.—I am, yours, &c., ST. VINCENT BEECHEY.

Hilgay Rectory, February 7, 1876.

P.S.—I hope it will not be considered any violation of the above if I say that the addition of one-fifth part of methylated alcohol to the beer preservative at once flattens it, thins it, and makes it keep better.—ST. V. B.

THE SCREWLESS STAND.

To the EDITORS.

GENTLEMEN,—The object I had in view when I had my camera-stand made was not to produce one different from all existing stands, but simply to do away with the screws as a mode for fixing the legs in any position required. This, I think, I have effectually accomplished by the use of the sliding ferrule.

In comparing my stand with that of Sir Thomas Parkyns I think mine has the advantage in respect of simplicity. It can be put up and taken down more quickly, and packs up more compactly, having no projecting screws. It has also the same advantages Sir Thomas claims for his; for with my triangular head one of my legs can be turned

under equally the same as his. In this there is a decided advantage when it is desirable to tilt the camera to any extent; for in using it in this way the camera is kept over the centre of gravity. For this hint I, in common with many others, thank Sir Thomas Parkyns; for although I had the means, the probability is I should never have thought to use it in this way.

But why Sir Thomas should have added that extra piece of wood to the top of his stand to rotate his camera I am at a loss to conceive; the camera would have turned on the top quite as well without it. But had it been necessary to have had something to rotate the camera with, a much less bulky affair would have been better. I have an arrangement on my stand not put for this purpose, but as a ready means of fixing the camera to the stand. It is this:—On the centre of the top of my stand I have a circular recess turned, about the diameter of a halfpenny and about the sixteenth of an inch deep, and on the bottom of my camera I screw a round disc of brass, which fits into that recess. When I place my camera on the stand I slide the brass into the recess, when the screw at once fixes the camera in place without any trouble.

In the case of the legs getting wet, Sir Thomas Parkyns thinks mine more likely to stick by the way than his; but I think it would only require the two stands to be seen together to get a verdict in favour of the screwless one. Both stands, however, are now before the public without any restrictions placed on their manufacture, and I have no doubt that the camera-stand makers will, by the end of the season, be able to give a correct estimate of their comparative merits.—I am, yours, &c., R. Kennett.

8, *Maddox-street, London, February* 9, 1876.

NOTES OF PRACTICE IN NAPLES.

To the Editors.

Gentlemen,—Allow me, in reply to a recent allusion to myself in your columns, to say a few words in self-defence.

"Free Lance," after having freely expressed his opinions on others, comes down upon me, and insinuates that I write on subjects which I have never worked at. I can tell him that, with few exceptions, all my negatives which required it have their skies stopped out, using the solution of shellac as a vehicle for the lampblack. For this purpose I have tried gum water, &c., but I have found shellac the best.

In my own practice I do not weigh the shellac, and if some remains undissolved it does not matter. I found this formula in Spon's *Workshop Receipts*:—

Liquid ammonia	1 ounce.
Shellac	2 ounces.
Water	1 pint.

The thanks one gets for trying to help others is that one is called an "outer barbarian," and one's formula stated to be "rubbish!"

Begging to be excused for taking up space,—I am, yours, &c.,

Villa Isabella, Capodimonti, "A Neapolitan Photographer."

Naples, February 5, 1876.

EXCHANGE COLUMN.

A very handsome show-case, filled with fifty-two specimen cards, made for a front garden, will be exchanged for a scenic background.—Address, H. Morris, photographer, Wandsworth.

ANSWERS TO CORRESPONDENTS.

Photographs Registered—

D. H. Cussons and Co., Southport.—*A Photo-lectern.*

J. Wilkinson, Burnley.—*Six Portraits of Mr. Ahmed J. Kenealy; and six Portraits of Mr. Peter Rylands, of Warrington.*

William Hanson, Leeds.—*Two Portraits of the Right Hon. W. E. Forster, M.P.; and one Portrait of Mr. Edward Baines, late M.P. for Leeds.*

☞ *Correspondents should never write on both sides of the paper.*

⁂ We are again compelled to leave over this week several articles which have been in type for some time.

F. W. Bannister.—The advertisement is certainly clever.

A Conservative.—We prefer the lens marked No. 5 on your list.

B. F. Taylor (Philadelphia).—Post-office order received. Thanks.

Aliquis (Glasgow.)—Your various queries will be privately answered.

Edwin A. Cleaveland (Hyde Park, Massachusetts).—Remittance safely to hand. Thanks.

J. D. M.—There is no means of which we are aware by which the sensitiveness of the collodion can be increased.

J. H. S.—The acidity of the ether has been caused by its having been kept standing in the light for so long a time.

Java.—Gutta-percha will answer quite as well as glass for a fixing bath; but for a solution of silver it proves very deleterious.

W. E. K.—One thickness of paper will be quite enough. Turpentine will prove to be the most suitable solvent for the balsam.

Geo. James.—The various names enumerated are all indicative of the same process, special distinctive names being selected by special firms.

An Old Novice (Pendlebury).—We think highly of your lamp, and hope to be able to publish your account of it, with a diagram, next week.

B. Smith.—Place a plate of roughly-ground glass over the negative while it is being printed; in this way the effect of the crack will not be perceived.

F. M'D.—The most ready means of detecting the presence of such small quantities of sodium and lithium as you imagine to be present is by the spectroscope.

Sartorius.—The pictures are so good that we must express the opinion that the lenses by which they were taken are very excellent for their purpose. A low-priced lens is not necessarily either bad or common.

X. Y. Z.—It is not at all difficult to obtain albumenised paper specially prepared for being used with a thirty-grain bath. We have frequently received excellent prints prepared on a bath even weaker than this.

Dunedin.—Registration of a picture does not, as you imagine, confer any exclusive right in all photographs of that subject taken from any particular standpoint. It merely affords protection to the particular picture registered.

Juvenis.—The chloride of calcium is sure to become liquified from its absorption of moisture from the atmosphere; but by placing the vessel which contains it in the kitchen oven or over a gas burner for a short time it will again become dry.

T. P. G.—The yellow tint upon the print is the result of sulphur toning. When the whites become discoloured from this cause they may be frequently restored by immersion of the print, for a very brief period, in a solution of bichloride of mercury.

Hector.—The enclosure consists of carrageen or Irish moss. The jelly which you extracted from it is known as "carrageenine," or "pectine." To purify it still further agitate it with dilute alcohol, and afterwards filter. We shall be pleased to hear of your success with it in both applications, to paper and to glass.

A. J. M'C.—Beyond telling you to use good chemicals and a portrait lens with full aperture no information can be given. Any good commercial collodion, used in conjunction with a thirty-five grain bath, and a developer made according to the directions given at page 199 of our Almanac, will ensure success.

Erratum.—In the article by Mr. William H. Sherman, at page 69 of our Almanac for the present year, *On a New Way of Treating an Old Bath*, and in the eighth line of that page, instructions are given to add twelve *ounces* of Beaufoy's acetic acid. Instead of "ounces" *read* "drachms." The error is so obviously a clerical one that no photographer would be likely to have been misled by it.

J. W. Grimshaw.—Our correspondent has sent us a parcel of lantern slides which he received in answer to a reply—with a post-office order—sent in answer to an advertisement in this Journal. We say, unhesitatingly, that the slides are very bad—the worst, indeed, we have ever seen. While we regret to find that our advertising columns are made such use of by individuals, it is obviously a matter beyond our control. We have handed Mr. Grimshaw's letter to our Publisher.

A Neapolitan Photographer.—1. The emulsion in question is said to keep indefinitely, and may at least be relied upon for many months. It does not in its finished condition contain any excess of silver, as our correspondent imagines. The plates possess very good keeping qualities, both before and after exposure.—2. Marine glue not being obtainable, the next best thing is shellac. If the glass surface be heated to a considerably higher temperature than the melting point of shellac our correspondent will perhaps be more successful.—3. The wood, whether in the shape of a dish or dipping bath, should be well heated, preferably in an oven, and the melted wax poured in and allowed to remain in contact with every part of the surface for a few minutes, in order that the pores of the wood may absorb a sufficient quantity. The surplus is then poured away, and, if the wood be kept warm for a short time longer, a smooth and impermeable surface will be the result.

Received.—J. Martin; W. N. Tiddy; T. Ross; F. Jennings; H. W. D.; A. Sutton; B. B. S.; "Cheap Jack;" H. B. Berkeley; R. B.; and others.

☞ Editorial Communications should be addressed to "THE EDITORS"—Advertisements and Business Letters to "THE PUBLISHER"—at the Offices, 2. York Street, Covent Garden, London, W.C.

The Glasgow Photographic Association *Redivivus*.—We are much gratified at learning that active steps are being taken to re-organise the Glasgow Photographic Association—at one time a body from which emanated much that was of value and interest to photographers. A meeting was held on the 2nd instant, when the names of several gentlemen were enrolled as members, and a committee was appointed to carry on the work so happily begun. The next meeting is to be held on the 16th instant, when officers will be elected. We wish the new, or revived, Society much prosperity and many useful and happy days.

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THE BRITISH

JOURNAL OF PHOTOGRAPHY.

No. 824. Vol. XXIII.—FEBRUARY 18, 1876.

HYPOSULPHITE OF SODA AND THE PERMANENCY OF SILVER PRINTS.

Strange though it may appear, it is none the less true that photographers as a body evince the greatest disinclination to adopt any new suggestion for their mutual benefit. To whatever cause this may be due —whether, as some suppose, it arises from lack of time to make the needful experiments, or from a suspicion of the efficacy of the novelty, whatever it may be—it has become the fashion to set it down to the so-called conservatism of the "fraternity;" but in very many cases it is only too obvious that conservatism has nothing to do with the matter, but that the reluctance shown in the adoption of new processes arises from pure indifference, or, perhaps, even downright laziness.

A case in point comes under our notice this week in connection with the use of carbonate of ammonia in the fixing bath for silver prints, upon which subject Mr. Henry Cooper, of Torquay, contributes an intesting article, relating his own experience with the bath in question, as recommended by Mr. Spiller, and in which he speaks strongly against the dilatoriness of photographers in taking up any improvements which may be made upon already existing processes or formulæ. In the present instance the charge may, we think, be very fairly supported; for, whilst a general outcry has been made during recent years against the instability of silver prints, the very persons who raise the outcry are either too "conservative" or too indifferent about the matter to adopt a system which can only be described as one of the greatest simplicity. Even were the results claimed for it doubtful, there need be no fear of its exerting any deleterious action upon the prints, nor is it possible to object to it upon the score of economy; hence it is the more difficult to explain the reluctance of photographers in adopting a means of, at any rate, improving the stability of their prints which is at once so simple and economical.

In spite of the enormous strides which have been made during the last two or three years in the various branches of photo-mechanical and other forms of so-called permanent printing, we agree with Mr. Cooper in believing that the time is yet very far distant when silver printing upon albumenised paper will drop entirely out of use and be consigned to oblivion. Great as are the advantages for certain purposes afforded by the various photo-mechanical processes, it would be idle to deny that they present difficulties which entirely unfit them for use by amateurs or in small establishments; while in the same quarters the inherent difficulties of the ordinary carbon process will long prevent its general adoption in preference to silver printing. The latter, possessing as it does the great advantages of simplicity and uniformity of result, has the practical experience of a quarter of a century to back it, and is capable of producing the very finest effects, its only drawback being on the score of permanency. Any device, then, by which that defect can be removed or ameliorated should be, one would imagine, hailed with delight by those who still wish to adhere to the old method of printing; but, as we have said above, and as Mr. Cooper remarks, such has not been the case.

Before proceeding to speak of the various plans which have been from time to time suggested for increasing the permanency of silver prints it would be well to consider in what manner the hyposulphite of soda operates in causing them to fade. It is needless to say anything with regard to the importance of thoroughly removing, by copious washing, the last traces of the salt itself; this is a matter which the merest tyro thoroughly understands, but which, we are afraid, many very far from the tyro stage neglect to do. If this point be not attended to action is sufficiently obvious, and the ultimate destruction of the picture is only a question of time. But there exists a popular fallacy that the total removal of the hypo. is the only point requiring special attention; this, however, is entirely wrong. It has been pointed out by several chemists—by Mr. Spiller amongst the number—that even after what is usually accepted as perfect fixation there still remains on the whites of the print a small percentage of silver, most probably in combination with a portion of the hypo., and which, sooner or later, especially if exposed to atmospheric action, tends to the final discoloration of the picture.

Mr. M. Carey Lea, we believe, also speaks of a series of complex salts which commence to form as soon as the fixing action commences, consisting of the tetrathionates and trithionates of sodium and of silver, the result of combination between the hypo. and the silver salt dissolved from the print. MM. Davanne and Girard, of the Photographic Society of France, published some years ago an account of an exhaustive series of experiments bearing upon this question, which are worthy of very serious study, while Gmelin has also devoted considerable time to the study of the reactions of the salts of gold with hyposulphite of soda.

Such being the state of affairs we have to consider what are the best means of preventing the deleterious action of the hypo. Many substances have been recommended, amongst which we may mention chlorine and alkaline chlorides. The print, after fixation and washing, was directed to be plunged into a very weak solution of chlorine or of a chloride; but, whether or not the desired neutralisation of the hypo. takes place under such circumstances, the injurious bleaching action of the chlorine renders the remedy as bad as the disease. About ten years ago Dr. Angus Smith, of Manchester, suggested the use of peroxide of hydrogen for the same purpose, its oxidising action being expected to transform any remaining hyposulphite into the state of sulphate—a salt which, in addition to its comparatively innocuous character, is more easily removed from the pores of the paper. This was largely manufactured for the special purpose; but the preparation was of so uncertain a character, and the beneficial effect so doubtful, that it rapidly fell into disuse, while many who tried it asserted that its bleaching properties were quite equal to those of chlorine.

These and many similar methods, however, deal only with the removal of the undecomposed hypo., and may be more correctly considered as safeguards against imperfect washing. The only simple method we are yet acquainted with which attempts to remove the insoluble silver salt left by the hypo. solution is that of Mr. Spiller, spoken of by Mr. Cooper in another column. It requires no difficult analytical operation to convince the most casual observer that a solution of hypo. rendered alkaline, as proposed by Mr. Spiller, produces a very different effect to that obtained with the neutral bath. The difference in the former case is that the whites, even when newly fixed, possess a more visibly pearly whiteness

than in the other; while if prints fixed in the two baths be compared by looking through the body of the paper the alkaline solution will be found to have rendered the print much more clear and translucent than the other, affording ample ground for the supposition that something more has been removed from the one print which is still retained by its companion. We have been in the habit, for some years, of working with an alkaline fixing bath, and do not hesitate to say that it greatly improves the beauty of the picture, and that up to the present time we have not been troubled with the slightest appearance of fading.

Complaints have been heard upon several occasions of the variable nature of the hyposulphite of soda obtained from different makers, and we must say that from our own experience we should judge such complaints to be well grounded. Looking at the sources from which the supply of this salt is obtained, and the low price at which it is now sold, it is easy to believe that many impurities are allowed to remain in the commercial article which a little extra care, entailing, of course, extra expense, would remove. One very common impurity which we have found is free acid, and it was this which first induced us to resort to the use of ammonia. Having observed that several batches of prints were more or less spoiled by discoloration in the fixing bath—the whites becoming quite yellow, though the bath was freshly prepared—we set ourselves the task of discovering the cause, and finally traced it to the fact that the hypo. was faintly acid, and that as soon as the toning action commenced the effect of sulphuration commenced also.

A few drops of liquor ammonia cured the evil completely, and we were so pleased with the appearance of prints so fixed that we have never given up the use of ammonia. In the caustic state, however, it must be used with caution, in consequence of its solvent action upon the albumenised surface of the prints; for this reason the carbonate of ammonia offers greater advantages than the liquor. The effect of acidity in the hypo. bath is very easily shown by dropping into it a very small quantity of any acid. The first effect will be a precipitate of sulphur; but if this be well stirred or mixed up with the solution, and a few prints immersed, they will be found to change to a dirty yellow in a very short space of time. Hence the importance of testing every new sample of hypo. before using it.

But let it not be imagined that the only source of sulphur, and, therefore, of fading, is found in the fixing solution. The albumen employed to give the surface to the print counts sulphur as one of its elements, and it has long been suggested that harm may possibly arise from this quarter. Many, indeed, go to the extent of averring that paper prepared with any but perfectly-fresh albumen contains in itself the certain seeds of decay. How far this may be true we cannot say; but it is certain that fading does occur sometimes in the most unaccountable manner and in spite of all care. But, whether decomposition of the albumen previous to laying it on the paper has a deleterious effect or not, we think that little doubt can exist but that decomposition after printing and in the presence of silver salts must exert a very powerful influence upon the stability of the image.

Great stress has been laid, and rightly so, upon the importance of thoroughly washing the prints after fixing; but that washing must be performed with judgment and care. It is not the length of time the prints are allowed to soak which benefits them, but the manner of such soaking. The water should be changed frequently, and, if possible, the prints allowed to drain at intervals; in fact, to sum up, the washing should be done as effectually and *as rapidly* as possible. Neglect in the latter respect will certainly end in trouble. We recollect an amateur complaining that his prints *would* fade in spite of all his care; and the specimens he exhibited certainly lent effect to his words. Upon questioning him as to his *modus operandi* we found that he used the best of paper, printed, washed, &c., in the usual manner, fixed in fresh hypo. solution, and washed thoroughly, *sometimes for as long as three days.* The last remark was sufficient; the prolonged soaking caused partial decomposition of the albumen, as shown by the dull look of the surface of his prints, and the inevitable *finale* was—fading.

In order to dispense with the use of so dangerous a salt as sodium hyposulphite it was recommended, some years ago, to substitute one of the sulphocyanides. These were tried, and, although they were found to act as solvents of the unchanged silver chloride, the balance of public opinion was against the innovation, it being alleged that an insoluble silver compound still remained in the paper after treatment with the so-called fixing solution. Supposing such to be the case, the question arises whether carbonate of ammonia, as recommended by Mr. Spiller and Mr. Cooper, or some other addition, might not render the sulphocyanides capable of acting as perfect fixing solutions.

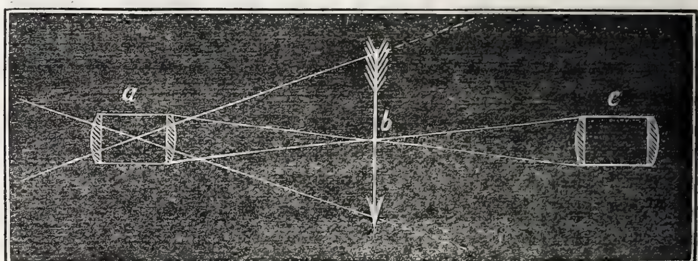
DIRECT ENLARGEMENTS.

At the last meeting of the South London Photographic Society the Chairman gave expression to an opinion he entertained relative to certain imaginary improvements in the optical means employed in the production of enlargements; and, as it appears that this opinion is held by a considerable number of photographers, we think it well to give a thorough elucidation of the subject at the present moment.

In the production of an enlargement of, say, a portrait of small dimensions it is an obvious fact that on the perfection of the small *cliché* depends that of the resulting enlargement, errors of focus and of texture, stains, harshness, and every other kind of defect being reproduced and intensified in the enlargement. Why, then, make use of a small *cliché* (whether transparency or negative) at all? Why not produce the enlargement by means of two lenses—one to form the image and the other to magnify it direct—without having to subject the image to the intermediary stage of being converted into a negative? In other words, why should not the image that is formed in the air, at the focus of the objective, be taken up by another lens and projected at once on the screen of the enlarging camera, without having to pass through the intervening procedure hitherto considered necessary?

In these queries the question is stated with sufficient fulness to permit its being perfectly well understood by every reader. The proposal made by Mr. Brookes (chairman, *pro. tem.*, of the meeting) was that two small portrait lenses of similar dimensions should be employed, one of which was to form the image, the other being placed in the axial line of the former, and at such a distance from the aerially-focussed image as to catch it up, so to speak, and send it onward to the large plate, upon which it would be depicted four, six, eight, or ten times larger than the original aerial image, which, of course, is that which would be received upon a ground-glass or any similar obstructing medium, were such interposed. The proposal was a natural one for a practical photographer to indulge in, and it would be a very desirable thing could a magnified image be secured by such means; but, as we shall proceed to show, it cannot be effected.

In the accompanying diagram *a* represents a lens, by which an image *b* has been formed at its focus, this image being that of a



sitter, here represented by an arrow, whose head may be assumed to be that of the sitter. Now, as light travels in a straight line, and as it is imperative that, in order to the second lens *c* being utilised in the formation of an enlarged image of the sitter, the rays from every portion of the subject must enter the latter lens—how, we ask, can either end of the arrow be brought within the scope of the enlarging lens *c*? It is quite impossible, by the means indicated, that this can be done; for as light (as we have said) travels in a straight line, that by which the head and feet of the sitter is formed would, after passing the focal point, proceed on in the direction indicated by the dotted lines, and, therefore, never impinge upon the enlarging lens at all. The only portion of the image that can be transmitted is that which lies in the axes of the lenses, and which in practice will

represent, perhaps, two or three waistcoat buttons of the sitter. That this is the case will be perceived from an examination of those direct rays which are represented as proceeding to a focus at *b*, and as then passing onwards to the lens *c;* it will, therefore, require little discrimination to see that, except a few of the rays in the axis, none other will be admitted to the enlarging lens, and hence that this proposed method of producing enlargements is entirely useless. From time to time we have heard of the same suggestion being made, but never until now have we considered it necessary to demonstrate by means of a diagram the futility of the idea.

This subject suggests another which is closely allied to it, namely, the projection of an enlarged image by means of an eyepiece lens or its equivalent. We have long been familiar with the fact that telescopic images may very easily be produced in the camera by the simple expedient of mounting a small camera upon the eyepiece end of the telescope, the degree of amplification depending upon the distance between the eyepiece and the sensitive plate. As might be anticipated, the amount of angle included is exceedingly small, the object glass of a telescope being corrected only for axial rays, and, indeed, owing to the tube, the transmission of an oblique ray would be quite impossible.

It may not be generally known that, by means of an opera glass used as a camera objective, a greatly enlarged image of any view to which it is presented may be obtained. Owing to the shortness of the tube, and to the optical principles involved in the formation of a large image by means of an objective when used in conjunction with a concave eyepiece, this form offers advantages in the production of a directly-magnified image not possessed by the ordinary telescope. We recently made several experiments with an instrument which, owing to its expense and the niceties involved in its construction, is very seldom manufactured. It has a short body, about four inches in length, but possesses very great magnifying powers, attributable to its construction. It is comprised of three triplet lenses in each tube; an object glass of large diameter and short focus—not plano-convex, but rather of the form known as "crossed;" a centre bi-concave triplet of large diameter and great curvature; and a plano-concave triplet eyepiece, the flat side being next the eye. This form of "tube," when used as an objective for the camera, produced images of great sharpness in the axis, the sharpness being more extended than we have seen it with any other form. By means of this instrument we obtained an excellent and sharp photograph of the sun three inches in diameter.

ATMOSPHERIC INFLUENCE ON THE SENSITIVE FILM.

There is probably no one thing in connection with the practice of photography that has been, and is at the present time, more earnestly desired than the means whereby the exposure in the camera could be materially shortened; and, although the resources of both the chemist and the optician have been severely taxed, that desire is still far from being satisfied. While we cannot suppose that the devices of the optician in that direction are quite exhausted, or that the chemist may not yet show us how to impart an exalted degree of sensitiveness to the films on which we operate, we think there is one factor that has not received the attention which it merits, and whose influence has not been sufficiently recognised.

It is within the experience of most operators that the necessary time of exposure does not depend altogether on the apparent quantity or intensity of the light reflected from the object which is being photographed; and we have repeatedly heard photographers of much experience say that, although they could almost invariably hit upon the right exposure at a first trial, they could not give any explanation of the source of such knowledge, except that by a kind of intuition—the result, doubtless, of long experience—they felt that an apparent brilliant light required a long exposure, while, on the other hand, on an equally dull day the same results could be got by a much shorter exposure. It is also a tolerably well-known fact that the sensitiveness of very sensitive plates, at least, is affected by the direction of the wind, and that the influence thus exercised varies in different portions of the globe—an east wind in certain parts of the world considerably retarding the production of the image, while in others an accelerating influence is generally observed.

Now, while we are aware that the varying quantities of solid particles of matter floating in the atmosphere materially influence the actinic power of the light which it transmits, and that gaseous emanations from various sources have an injurious effect on a sensitive film, we also know that the influences of air currents have been observed in localities and under circumstances where solid particles and gaseous emanations were at least at the minimum, and in such small quantities as to be practically out of court. Such being the case, we have recently given the subject some consideration, being forced to the conclusion that there exists a much more uniform and universal cause of atmospheric variation, and to the belief that the presence or absence of ozone may ultimately be found to influence photographic manipulation to a much greater extent than is generally supposed.

Notwithstanding all that has been written about that curious body, ozone, it must be confessed that we really know very little regarding it, and that in saying that it is an allotropic form of oxygen we have said nearly all that can be clearly proved concerning it. One thing is tolerably clear—that three volumes of oxygen condense into two volumes of ozone, so that ozone is one and a-half times heavier than oxygen. It may therefore be supposed that a molecule of oxygen, consisting of two atoms, is capable, under certain conditions, of taking up a third atom without increasing in bulk, and so becoming ozone; and the undoubtedly great oxidising power of ozone may be due to the readiness with which the molecule parts with the third atom, which, being in the nascent state, enters more readily into combination than the molecule of two atoms, each of which are partly satisfied with themselves, can do. Be this as it may, it is well known that oxygen is converted into ozone at the moment of decomposition of certain of its compounds, and it seems not improbable that the recognised increased activity of the so-called nascent oxygen may really be due to the formation of ozone. For example: in bleaching by chlorine it is well understood that the action is not due to chlorine at all, but to oxygen in the nascent state, or, more probably, to ozone. The chlorine, in consequence of its affinity for hydrogen, decomposes the water, forming hydrochloric acid and setting the oxygen free, in which condition it combines with the colouring matter, producing the bleaching effect; but it is not improbable that six atoms of chlorine may take up six atoms of hydrogen, and leave the three atoms of oxygen to form one molecule of ozone; thus $Cl_6 + 3\ H_2\ O = 6\ HCl + O_3$ in one molecule of ozone.

Whether the absence or presence of ozone in the atmosphere be the cause of certain epidemics we are not aware, but we have had frequent opportunities of proving that its absence was co-existent with the prevalence of yellow fever on the South American continent. At the instigation of the Surgeon-General of one of the colonies, daily observations of the quantity of ozone present in the atmosphere were made for a series of years, and from these it was abundantly evident that for some time before, and during the continuance of, an outbreak of the fever it was almost entirely absent, while under ordinary circumstances it was present in considerable quantity.

It is not difficult to suppose that the presence or absence of such an active agent in our atmosphere must have some influence on the sensitive photographic film, and, therefore, experimentalists have on various occasions turned their attention to the subject. At pages 491 and 503 of our volume for 1867 we published the results of some experiments which seemed to show very conclusively that the latent image was entirely destroyed by the action of ozone. From some experiments we have recently made, with a different object in view, we are not quite satisfied with the results then obtained, and are at present repeating them under more satisfactory conditions and with considerably different results. The ozone with which the former experiments were made was produced by the action of phosphorus on common air. The mixture of ozone, air, and nitrogen thus produced we now find to contain phosphorus impurities sufficient to cast suspicion on the results realised. Ozone obtained by an electric spark we also find impure from considerable traces of nitric acid, and therefore we have had recourse to the action of sulphuric acid

on permanganate of potash with much better results. As, however, our experiments are not yet complete, especially in so far as the action of purified ozone is concerned, and as this article is already sufficiently lengthy, we must stop now, promising to give our readers the results of the experiments as soon as they are completed.

IMPROVEMENT IN SILVER PRINTING.

I send at present a brief mention only of some investigations having for their object the improvement of sensitive paper for positive printing, with which I am at present engaged; next week I will send details. The method consists in adding to the positive bath the substances obtained by the action of sulphuric acid on gelatine.

It is now about twelve years since I proposed the use of this material as an aid to development. I now find it most valuable in preparing printing paper. I use it in precisely the same form as before; in fact, the material with which I am working was prepared in 1865.

The addition of this material to the silver bath produces a remarkable change in the printing qualities of the paper, which is thus rendered fully twice as sensitive, and not only prints deeper, but with a singular difference in tone, which is by many degrees warmer and richer; and it is certain that paper which prints to a rich warm shade in the frame tones more easily in the gold bath.

The greatly-increased sensitiveness which this addition lends to paper has led me to think it might be useful also in emulsions. As to this I am not yet able to speak. Careful experiments are in progress, but at the time it is necessary to close this in order to reach the steamer I have not been able to test the emulsion. I have ascertained, however, that the material can be introduced into the emulsion, which is one point gained, and by next week I expect to be able to speak of the results. M. Carey Lea.

Philadelphia, February 1, 1876.

CARBONATE OF AMMONIA IN THE FIXING BATH.

It is somewhat surprising to notice how very slowly some real and important improvements creep into favour. There are two reasons which speedily start into one's mind in thinking over this apparent anomaly, and they are these:—1. Professional photographers, as a body, are extremely conservative and very loath to change old-established modes of working in even the smallest degree, and the operators who, leaving good establishments, start in business for themselves, are very apt to blindly follow out the *régime* to which they have been accustomed, and to believe any proposed innovation merely the whim of a fantastic amateur. I could, from my own experience, give many most amusing instances of this trait. 2. Such an enormous number of suggestions—good, bad, and indifferent—appear every year in the journals that the few really valuable ones are apt to get crowded out and then forgotten, unless some one or more enthusiastic partisans are found to reiterate again and again the details of the proposed alteration, and thus keep it constantly before public notice, until at last the profession begins to think that there must be really something in it, and determine to give it a trial.

It is, unfortunately, not always the fact that a truly good thing will make its way in spite of all obstacles. Provided there be opposition to it, it stands a chance; but the danger is of its remaining comparatively unknown, and thus gradually sinking into oblivion.

The foregoing thoughts were suggested by seeing in The British Journal of Photography for February 4th a recommendation from America for the adoption of Mr. J. Spiller's plan of adding carbonate of ammonia to the hypo. fixing bath.

It may seem strange to some that I should be troubling myself to write about the fixing of silver prints when all the cry is of "carbon! carbon!!" But I am not by any means the only one to say "silver is not dead yet!" It is by no means a profitable task to try to bury or smother out of the way a process so flourishing and lively, and which is so likely to remain in a vigorous condition for a long time to come.

What I wish to do now is this:—I want to impress upon my readers as earnestly as I can the fact that, by adopting a very simple change in their present method of fixing their prints, they may vastly increase their chances of permanency, and thus remove, at any rate to a great extent, the one reproach which is constantly dinned into their ears when silver printing is mentioned nowadays.

It is many years since the advantage of the modification just referred to was most conclusively shown, and yet the number of photographers who have adopted it might, I believe, be counted on one's fingers.

Now, whence arises this remarkable neglect? Since Mr. Spiller showed the advantage of using carbonate of ammonia in the hypo. bath I am glad to say I have never produced a silver print that has not been fixed in a bath so composed; and I am also happy to state I have my reward in the fact that, so far as I know, not a single print has shown the slightest tendency to fading, or to the acquirement of that objectionable cheesy tint in the whites which one so often sees in looking over the collection of a friend.

During several years I have most strenuously enforced upon those with whom I have come in contact the importance of adopting this alteration in practice; but, I regret to say, I have really converted very few. Most will agree with me whilst I am talking to them, and I may flatter myself I have made some impression, but I afterwards find the matter has been speedily forgotten. Others do like one friend—immediately write off and order a large jar of the carbonate, and then in a year or two tell me it has never been opened. Or, again, the opposition of stupid operators has prevented the introduction of the method. One gentleman was under the impression for some time that all his prints were fixed in the bath recommended by me, and was much annoyed to discover his operator had given up using the carbonate of ammonia. "It was too much trouble, and he didn't see the *use* of it." But there is a use in it, and a very strong reason why all who attach a value to their productions should employ it.

In Mr. Spiller's experiments he found that, after fixing silvered albumenised paper in a plain bath of hyposulphite of soda, a considerable amount of silver remained in the parts of the paper not exposed to light, showing that one of the compound salts resulting from the combination of nitrate of silver and albumen was not entirely soluble in the ordinary fixing bath. If this silver salt were a stable one, and unaffected by light and certain gases, its presence in the whites of a photographic print would be immaterial. Unfortunately it is easily affected, and its presence is speedily made manifest by discoloration of the pearly whites, should the print be exposed to certain influences, such as sulphuretted hydrogen gas. Mr. Spiller then set to work to ascertain, if possible, what fixing agent would remove this silver salt from the film of coagulated albumen, and at last discovered that the addition of carbonate of ammonia to the solution of hypo. very greatly increased its solvent action upon this compound salt, although it did not remove it entirely. Still the difference found, upon carefully testing the prints, made it at once apparent that we had here a most valuable increase in the fixing power of our bath, and I at once adopted it in my practice.

The proportion of carbonate of ammonia must not be *less* than half-an-ounce to each pint of fixing solution, and may with advantage be as much as one ounce. The fused carbonate in lumps must be used, and if it require crushing at all to aid in rapidity of solution this ought to be done at the time of using, as carbonate of ammonia in powder speedily loses its good qualities.

My practice is to take the requisite quantity of carbonate, which I guess at, and if the lumps be very large I place them in a piece of strong paper and crush them with a few blows from a mallet. But this is seldom necessary, as I always use moderately-warm water to effect solution. When I am ready for toning I take about one and a-half ounce of carbonate of ammonia and six ounces of hyposulphite of soda, and, placing them together in a stone jug, pour upon them forty ounces of warm water. With an occasional stir with a glass rod solution will be effected before the time the fixing bath is wanted.

I adopt this method for two reasons:—I like to have my fixing bath at a temperature of about 70°, and I also prefer to use it as freshly made as possible. The prints remain in it a quarter of an hour. If the batch of prints be too large to be fixed at one operation the bath may be used a second time, provided it is immediately after the first lot of prints is removed. On no account must the bath be used more than twice, and it must not be used at all if it have been standing for more than a few minutes after prints have been fixed in it. The stone jug in which the solution was made must be thoroughly washed. This last is a point very often neglected, I fear, by the majority of operators.

Those who will take the trouble to adopt the above method of fixing their prints for the remainder of the time they may use silver will not, I feel sure, ever have cause to repent it.

In conclusion: I may briefly sum up the advantages of adding carbonate of ammonia to the fixing bath as follows:—More perfect fixation of the prints; the almost entire removal of an organic salt of silver from the lights, which, if allowed to remain, will probably lead to cheesiness; thirdly, the entire absence of any chance of sulphur toning.

To each reader I would say:—Are not all these advantages worth purchasing at the expenditure of so little extra trouble and so little extra cost?

I have written to so much greater length than I intended when I took my pen in hand that I must defer for another week the little I have to say on staining the collodion film. HENRY COOPER.

FURTHER NOTES ON CHEMICAL AFFINITY.

FOR reasons of a very sufficient nature I was not able to study THE BRITISH JOURNAL OF PHOTOGRAPHY for the 4th inst. in time to send the note Mr. Berkeley's letter seems to call for. The published results of the labour of workers like that gentleman and many others are, for the thorough working out of our beautiful art, of far more value than a bushel of his opinions or mine on abstract questions of theoretical chemistry, and so long as such details are so freely given we shall continually approach nearer to perfection.

Mr. Berkeley speaks of himself as a "self-constituted chemist," and so, without offending his *amour propre*, I may point out where he errs in the question—so much reminding one of the old fable of the two knights and the shield—regarding the behaviour of the halogens. He states that he treated silver bromide with chlorine water and failed to produce any effect, and he wishes to know how this is. In the first place, if no effect *were* produced his chlorine water must have been too long kept, and then the chlorine would all have been converted into hydrochloric acid. But I think it very likely that Mr. Berkeley's chlorine water was fresh enough, and that he did change at any rate a portion of his bromide into chloride, for he states that the liquid became of a more pronounced yellow. If this were so it would mask the slight alteration of colour required by the conversion of the bromide, and would be the first sign that I should look for to prove that conversion, as it would show the liberation of the bromine.

As to the smell. Well, Mr. Berkeley must have fine olfactory perceptions if he can detect the presence or absence of a trace of chlorine in the presence of bromine by his sense of smell alone. I recommend him to try the experiment again, and, after repeated shakings, to add ether in the proportion of about a drachm to an ounce of his mixture of chlorine water and bromide, and, after well shaking, allow it to stand. The latter will very probably rise towards the surface, but immediately on the top a portion of the ether will float, holding dissolved in it the whole of the disengaged bromine, which will impart to it, even in small quantities, a decided yellow tint. Or, in place of adding ether, he may stick the end of another smaller test tube into the domestic starch bowl, and then, pressing a piece of filter-paper to it, use it as a stopper for the tube containing the mixture, and cause the latter to boil. The presence of the bromine will again be shown by the orange stain it will impart to the starch. He must not forget that a comparatively large amount of chlorine water will be needed to convert a few grains, for water dissolves only twice its volume of chlorine, and thus one litre would only contain twice $\cdot 0896 \times 35 \cdot 5$ grammes $= 31 \cdot 8$, or about three per cent. He must yet be careful, on the other hand, not to add too much chlorine, or the colour will be re-absorbed.

I see, also, that Captain W. de Abney has, last week, described a very convincing experiment, bearing on the same point, in these pages. He also states in his communication that iodine will displace bromine. I also have shown the same thing may occur; but if the experiment be tried in the way the context suggests very little visible result will be obtained by the tyro, seeing that only a trace of iodine dissolves in water. G. WATMOUGH WEBSTER, F.C.S.

THE PERMANENCY OF PIGMENT PRINTS.

WE have read with much interest the able remarks contained in an article with the above heading in your last issue, and take advantage of the opportunity of giving our views upon a subject of so much importance. Being the holders of the patents for the manufacture of carbon tissue, we take for granted that the observations in that article are specially relative to ourselves, and it is now our object to indicate the principles which have guided both our predecessors and ourselves in the manufacture of pigmented tissues and their employment.

In the first place, we are well aware that a pigment print is not *necessarily* permanent; this desirable quality depends, as the writer of the article justly observes, upon the observance of certain conditions.

A first and most important condition is the permanent nature of the pigment employed. The establishment of printing in permanent pigments in this country is due to three well-known gentlemen—two of them, Messrs. Swan and Johnson, having reputations as scientific chemists; the third, Mr. Benyon-Winsor, being the head of the celebrated firm of artists' colour manufacturers. Here then, at the outset, was a combination of technical and practical skill calculated to lay the foundation of a system of permanent photography upon the most secure basis, namely, the permanence of the pigments used; and this has been steadily kept in view from the beginning.

It is almost needless to remark that this branch of the manufacture presents grave difficulties. There is no lack of pigments of undoubted permanency, but many of these exercise such an action upon the vehicle employed, the gelatine, as to render them unavailable. Hundred-weights of gelatine and miles of paper have been expended in experiments in this direction.

The production of a permanent print in carbon on a simple pigment is a matter of no difficulty whatever. It is when the manufacturer is called upon to imitate the fleeting beauties of the gold-toned photograph that troubles arise.

Thanks to long experience and careful working-out of many difficult problems, pigmented tissues are now made which give results rivalling the finest photographs in brilliancy and colour, being, at the same time, with *proper* treatment, absolutely permanent; but we notice with regret a demand arising from photographers who have lately adopted permanent printing for exaggerated tones of colour, as it is exceedingly doubtful if this demand can be met in permanent pigments.

We also notice a recommendation that the transfer collodion employed should be tinted with aniline colours. These colours, from their want of stability, never enter into our manufacture in any way; and here again is a demand for a material of which we entirely disapprove, and which we should certainly not supply.

Another cause of want of permanency is said to be the vehicle in which the pigment is contained. This had the careful consideration of Mr. Swan at a very early stage, and he originated the practice of immersing the picture after development in a solution of alum, thus converting it into a species of leather. This indurating effect is not, however, produced at once, and it is quite possible that a recently-developed pigment print would swell up under the application of moisture, whilst the same print a few months after would be found to be completely non-hygroscopic.

The writer of the article in your last issue thinks it an advantage that the particles of carbon should be enveloped in a resinous varnish, as in the case of an engraving; but it is precisely to this cause is due the fact that old engravings and old pictures have the well-known yellow hue, whilst, on the other hand, the system employed by the old masters, known as "tempera printing," and which has *unaltered* gelatine for its basis, has preserved to us some of their finest works with unchanged lustre.

Another cause of change of colour in pigment printing is the imperfect elimination of the salts of chromium employed; if these be left in the print there will undoubtedly be deterioration, but in *no* case *destruction*, of the picture. There may be examples of faded pigment prints, but we venture to say that not a single instance can be shown of a pigment print having done more than changed colour. In fact, pigment printing at its *worst* is equal to silver printing at its best; for, whilst the former if improperly treated *may* change colour, it seems impossible to prevent the absolute disappearance of the latter.

In the elimination of the chrome salts the advantage of the double transfer process is at once apparent. In the system of double transfer the picture is developed upon a temporary support, and the chrome salt, being easily washed out of the picture, does not penetrate this temporary support, and, consequently, is not transferred to the paper or material upon which the print finally remains. In single transfer the chrome salt at once penetrates the material upon which the picture is developed, and, if not carefully treated afterwards, remains, very much to the detriment of the picture.

In order to get rid of every trace of the salts used in the manipulations, all that is necessary is to immerse the pictures for a sufficent time in a solution of alum; if the experiment suggested by the writer of the article had been tried with a strong solution of alum instead of simply water, it would have required but little washing to get rid of every trace of chromic colour. The treatment with alum serves two purposes: it gets rid of the chrome salt, it indurates the gelatine, and a prolonged exposure to treatment does not seem to have any prejudicial effect upon the picture.

The practical conditions of success are not likely to be misunderstood by those most interested, and the history of autotype furnishes some guarantee that the "moralities" of the trade will be respected. The very *raison d'etre* of autotype is the production of *permanent* photographs. Its promoters are not pledged to any particular routine; they will be glad to receive enlightenment from any quarter, and, whilst labouring to improve their own productions, will carefully consider suggestions from other workers.

Now that a fresh impetus has been given to the production of permanent photographs, the original inquirers and the practical workers combined have an excellent opportunity of bringing the question of permanent photographic printing to a satisfactory solution, and the result can scarcely fail to improve the status of photography and confer a boon upon the public.

THE AUTOTYPE COMPANY.

ON MAGNITUDE AS AN ELEMENT OF ATTRACTIVENESS IN PHOTOGRAPHY.

[A communication to the South London Photographic Society.]

If anyone were to be asked to define the greatest advantage which has resulted from the practice of photography his first impulse would probably be to refer to the minuteness and exactitude of its reproductions.

He would instance the fact that even the smallest photograph, if carefully and artistically rendered, would bear examination under the microscope, and would, when subjected to this test, bring out details which were invisible to the naked eye. The portrait of an individual, for example, would exhibit the trace of a scar, or the existence of some minute defect, which might never have been noticed by the most intimate friend of the original; or the view of some imposing architectural elevation would show an inscription or a marking on a particular stone which was all but invisible to the eye upon a distant inspection.

This is undoubtedly the case, and it may, perhaps, be fairly asserted that the popularity which from the very first attended the introduction of photographic portraiture was due to this cause. The public were literally astonished at the fidelity with which not only each feature but every blemish was reproduced; and, pardoning the sometime unwelcome truthfulness which scorned to register beauty without at the same time chronicling defect, it accepted the camera as the most faithful expositor of the reality, and gave a hearty welcome to each undoubted improvement in its use as a substantial gain to the cause of advancing science. One result, however, of this wonderment and consequent approbation was a tendency on the part of operators to adhere to that minuteness of portraiture which had first secured the public regard. All their efforts were directed to the obtaining of *perfect miniatures;* it was scarcely considered desirable to risk the experiment of photographing on a larger scale.

It was only by degrees, as new labourers came into the field, as fresh processes were discovered, and as larger and more costly machinery came into general use, that the original miniature-sized *carte de visite* began to assume a more pretentious air—to develope into the "cabinet," the "boudoir," or other enlarged portraits with which we are now so happily familiar. This gradual growth of the size of plate employed, not only for portraiture but for landscape and general photography, seems to me to indicate a natural yearning on the part of mankind for something more satisfying to the eye than the mere prettiness and wonderful accuracy of minute representation. It is akin to the feeling with which, while we appreciate and admire the reticulations on a single leaf, we stand in amazement before the glories of the sunlit forest glade—while we view with delight the graceful form of the miniature gazelle, we are struck with awe at the aspect of the majestic monarch of the woods. In other words, prettiness and beauty each makes a distinct appeal to the æsthetic principle within us, and there is a feeling of dissatisfaction in the mind when we see that which is admirable on a scale too minute to come up to the full measure of our reasonable expectations.

No man who has once looked upon the *Venus de Medici* or the *Apollo Belvidere* (sculptured as they are of the life-size) would ever be content to exchange them for statuettes of the same figures carved in ivory a few inches long, were the workmanship ever so perfect; and, *vice versâ*, if bronze or ivory models only of these exquisite pieces of art had come down to our days as minute representations of the full-sized statues, who would not have looked upon them with a sentiment of yearning for something approaching more nearly to the "Godlike stature of man?"

That a feeling somewhat akin to this has actuated the public mind with regard to photographic portraiture seems apparent from the fact that numerous and, in many instances, highly-successful efforts at enlargement from the negative have been suggested of late years. The noble example set by Mr. Crawshay in offering prizes for this especial branch of photography may have done much to stimulate exertion in this field; but the craving for a grander scale of representation than that which at first gave satisfaction seems to me to lie at the root of all this ingenious activity.

I think we may be said to be standing now upon the middle ground, between a hearty appreciation of the triumphs of the past and a hopeful anticipation of what photography may be able to do for us in the future in respect to enlarged artistic results. I am sanguine enough to think that we are but standing on the threshold of discovery when we contemplate what may be the future of this grand and interesting art. The steady progress which from the very first has attended its footsteps, and the almost unending variety of application of its useful processes which each year is witnessing, justify us in predicting brilliant successes hereafter to be realised. Let us not be faint-hearted. Let us have faith in the possibilities of the camera, and patient exertion will, in the end, ensure renewed triumphs. "*Possunt quia posse videntur*" was the dictum of the old Romans—"They are able to do (a thing) because they seem to be able to do it," and, doubtless, many of our greatest discoveries in science have resulted from this energetic faith. My object, then, in writing this paper is to invite further speculation upon this question of enlargement. I am not presumptuous enough to imagine that I can solve the difficulty myself; but I lay before you one or two suggestions, more by way of inaugurating a discussion upon the subject than in the hope of seeing any immediate solution of the question.

We cannot be blind to the fact that every effort to produce enlargements from an originally small negative must labour under the disadvantage of unintentional exaggeration. A wrinkle, for instance, or even a sweet dimple with its natural shadow in the minute similitude, may be magnified by the process of enlargement into a sinister expression or, perhaps, even an absolute scowl. It is the province of true art to tone down these exaggerations, and we know that in the *ateliers* of our best photographers skilful arrangement exists, either in the mode of lighting the figure or of retouching the negative, by which these almost unavoidable crudities of the enlarged picture are removed.

But, suppose it were possible to secure at once all the delicacy and correctness of the smaller style of portraiture with the bolder and more striking effect of the same features rendered "life-size," can we doubt that photographic art would have made a grand progressive stride? Let us imagine for a moment that at one of our annual exhibitions, instead of beholding upon the walls a series of portraits or views—admirable, indeed, for their truthfulness to nature, yet still from their minuteness of delineation requiring a constant "craning of the neck" and a closeness of inspection fatiguing in the extreme—we could have our sight regaled with some such scene as is to be witnessed annually in the rooms of the Royal Academy, at Burlington House. Portraits, for example, life-size, not necessarily coloured (though for my part I can see no valid reason why painted photographs, some of which are so effective, should be excluded from exhibitions), historical scenes, landscapes, interiors, ruins, sea views, *genre* pictures—all on a scale capable of being viewed at a moderate distance without any straining of the sight—can we doubt, I say, whether such an exhibition would be successful? And are we then bound to confess that, although up to the present time photography has not achieved such triumphs, it is impossible to conceive that it ever should do so?

With the advances which have recently been made in the various enlargement processes, with the progressive improvements in carbon or autotype printing, with the introduction of sensitised tissues capable of being extended to any size, to say nothing of the improved character of our modern cameras and lenses, I think he would be a bold man who should pronounce the realisation of such an idea impossible. I may be reminded that, by *combination* printing, we could already with our existing mechanism achieve such a result, but that it would be too costly an experiment to carry out. It may be suggested that all we should have to do would be to construct colossal cameras, and to devise our baths, our glass plates, and all our apparatus upon so enlarged a scale as to secure a grand result at each single direct exposure.

Well, do not let us be frightened at the thought of increased exertion or cost, if we could only be assured that success would be likely to crown our efforts. These are days of gigantic designs. Our harbours of refuge capable of sheltering the navies of the world, our network of railways, our submarine telegraphic lines, our "Woolwich infants"—all tell of the ease with which colossal efforts are made when corresponding results may be fairly anticipated.

It never entered into the wildest speculations of Sir Isaac Newton that a gigantic reflecting telescope, like that of the late Earl of Rosse at Parsonstown, could ever be constructed; but the erection of that magnificent instrument led to the resolution of the nebulæ into separate groups of stars, and opened up a new future to astronomy. And I suppose we shall all agree that the extreme limit of size and effectiveness to which cameras may be extended has not yet been reached. It is probably more a question of expense than of possibility which stands in the way.

If some wealthy patron of the art were to offer the means of constructing a camera upon the grandest scale compatible with our present optical capabilities, might we not anticipate some very novel and interesting results in the character of the plates produced? Or is it even absolutely necessary that any very exaggerated sum would be required in order to ensure such results? As a matter of course the body of the camera would be made of cheaper materials than those now in use in our delicate cabinet work. The fittings need not necessarily be of brass, nor the wood of polished mahogany; the lenses (aye, as Shakespeare says, "there's the rub")—well, the lenses—would they of necessity have to be constructed entirely of glass? or, if so, need they be absolutely cast in single pieces of so large a size? Might they not be made in sections, to be afterwards neatly joined together? I am not now speaking of the achromatic arrangements, which we know can be so made, but of the separate segments of some imagined colossal lens. We must remember that the photographic camera, after all, is only a kind of enlarged mechanical eye, of which the focussing apparatus is the crystalline lens; the stop and racket-work the iris, with its wonderful arrangement for varying the size of the pupil; the ground glass the choroid coat; and the sensitised plate the retina, with its nerve connections communicating the perfect impression to the brain.

Many of the Dutch philosopher's (Muschenbrœk) most important discoveries in microscopy were made, not with carefully-polished lenses, but with small filaments of glass melted in the flame of a spirit-lamp and flattened on a smooth iron plate to the requisite curvature. And so possibly, I would venture to suggest, a camera lens on a gigantic scale might be constructed, at least for the purposes of experiment, with glass for its centre as the representative of the crystalline lens in the eye, and with acidulated water, alcohol, turpentine, Canada balsam, or some other suitable liquid, enclosed in properly-shaped glass vessels to imitate as accurately as possible on a large scale the achromatic effects of the aqueous and vitreous humours in the natural eye. Or, probably, when the experiment came to be tried, it might be found that the lens, if of glass, need not be made on so large a scale as might at first sight appear necessary. The stop usually cuts off a considerable portion of the outer rim or circumference.

Would it be absolutely necessary to construct this part of the lens which is so usually stopped out? Would not the same effect be produced if the lens were polished only to the smaller size, making due allowance for the action of the stop? These and similar questions are, however, rather matters for discussion by practical opticians than for mere amateurs like myself. I would not be so rash as to pronounce a positive opinion on the subject, though I cannot help thinking that the difficulty is in some way to be overcome.

America—the country of inventions as of natural scenery on a grand and imposing scale—is about, we are told, to construct a telescope as far surpassing that of the Earl of Rosse as his exceeded all that had been witnessed before. Shall we leave it to her to take up the idea of a "Brobdignagian" camera and to cover the walls of her forthcoming Philadelphia Exhibition with triumphs of photographic art which shall throw into the shade all that we of the Old World have hitherto been able to accomplish? I have seen some magnificent examples of what she can do already in the way of large plates in the splendid scenery of the Yo Semite Valley; but I hope, in no spirit of rivalry, but in the honest endeavour to push to the utmost available extent the resources of that fascinating art which we cultivate in common, we shall not without a struggle give up the palm for grand and striking results in direct photography on a far larger scale than anything which has hitherto been submitted to the approbation of a curious but intelligent public.

F. F. Statham, M.A., F.G.S.

ON THINGS IN GENERAL.

My last utterances seem to have wounded the susceptibilities of one gentleman and required explanations from another. With regard to the latter (Mr. Hooper), his quotation gives rather a different air to his paper from its significance as originally printed. He is perfectly right in protesting against fashionable ugliness, and to that extent his remarks may be read with advantage. I agree with him, too, that cheap work and good work do not usually go hand in hand; but in going out of his way to insinuate that those who require prepayment do so because of their knowledge of the worthlessness of their productions he is very far from the mark. The very men who initiated and continue the practice are those who charge the highest; and Mr. Hooper, of all others, should know that in a business conducted entirely on the prepayment system not half the capital is required to carry it on that is needed for a "booking" *clientèlle*. In addition, the same quality of work can be sent out at a much lower price. One very common source of annoyance is avoided by the system: the public now is so unreasoning and exacting that it will come to be photographed, and, be the picture ever so good, decline to pay for it if not up to some imaginary standard of its own. Prepayment overcomes this difficulty well.

The aggrieved gentleman who hails from beautiful Naples had better read a second time what I wrote, for I did not insinuate that he wrote on subjects he had not worked at; I did not call his formula "rubbish;" nor speak of him as an "outer barbarian"—those phrases being meant for the newspaper writers who dealt in the eruptive-disease-photograph rubbish. With regard to the shellac, if "A Neapolitan Photographer" had deigned to explain his *modus operandi* in dissolving his shellac his information would have been useful; but as it now stands it is useless. If a pint of water, an ounce of ammonia, and a couple of ounces of shellac are mixed together, I should like him to say what results he will get if he do nothing but give the mixture a shake or two.

I have something further to say about writers airing their opinions on subjects they are ignorant of. A week or two ago the *Athenæum*—that paragon of perfection—levelled a very uncalled-for sneer at the Woodburytype permanent process. It was rather a "bold" thing, it stated, to call anything connected with photography permanent. If anything be permanent Woodburytype is, I think. But the *Athenæum* is nothing if not omniscient. It was only a week or two ago that it delivered itself of a complete lecturette on the artistic canons that should guide one in the "art" of sticking stones together to make rockwork at the back of a water-tank for fishes. It devoted well-nigh a column of its space to the purpose, and in the same article fell foul of one man's literary style for using the word "aquarium" over 250 times in a book of fifty or sixty pages, while in its own critique the word occurs over a score of times in one page! So much for consistency!

But this question of permanency in so-called carbon prints—recently well treated by the Editors—is a very serious one, and one not to be burked by any concerned. All "carbon" prints, or autotype prints, contain some pigment to improve the dirtiness of effect that carbon used alone invariably produces. Are the Company careful enough to eschew all fugitive colours? They were not some time ago. I think they could a tale unfold about *magenta* in connection with their tissue, for what colour is so fugitive as it? Let us hope they have learned wisdom. The latest instance of carbon, the Lambertype process, has tints of such great beauty and delicacy that there *must* be a large proportion of foreign pigment added to the carbon. I ask the Company, boldly, to let us know what it is? We want to learn none of their trade secrets, but must know—Is there magenta in it? Is there cochineal colour in it? If there be, cease to call them permanent prints.*

The Autotype Company are enterprising, and they have been fairly liberal; now they are reversing their policy when someone has improved their processes and made them of increased value. But photographers, though not devoid of sentiment, taken as a whole, will not stand whining; and the Autotype Company will do well to stand on the undoubted merits of their materials, instead of speaking about the money laid out and the necessity for now reaping some benefit. I suppose it is pretty well known that it was not Messrs. Spencer, Sawyer, Bird and Co. who incurred the expenditure in the earlier stages of autotype manufacture. I am not saying this with any illiberal feeling; for, as I have just said, the present Company are enterprising, and they are deserving of success. I think, however, they have practically signed their death warrant, for the fact is patent that carbon tissue has been sold for years in open market without their having power to stay its sale; indeed, the first-named partner in the firm, before he was connected with the Company, publicly advertised it in this Journal, and the obstacles they place in the way of its free use is just the plan to help opposition. I may say, *en passant*, I think Mr. Johnson quite right in publicly drawing

* From an article by the Autotype Company, in another page, it will be seen that only *permanent* colours are employed.—Eds.

attention to the credit due to him for his share in the working out of the process; that mysterious entity, "Lambert," was getting the lion's share of that as well as of the profit. A fair amount of credit, too, belongs to the Editors of The British Journal of Photography for their persistent advocacy of carbon through a long series of years. It is rather droll to see a contemporary recently attempting to place itself in the van in regard to its paternal interest in the now stalwart child.

What a hopeless fog and muddle seems to hang over the film-staining question! Such a flourish of trumpets heralded its advent that a new era was hoped for; but the original results are now all controverted, or, at least, contradicted, and its upholders seem to prove its futility while imagining they are upholding its utility. Captain Waterhouse appears to have made many experiments, for which he deserves the thanks of the community, though the practical results seem as yet *nil*. They bear dead against Professor Vogel's theory; but I am inclined to think that in the search after optical phenomena the chemical results have been lost sight of. If a red salt turn yellow when added to collodion I should expect the collodion has become chemically altered; but the gallant Captain cannot, surely, have overlooked this, for he seems an accomplished chemist.

I always look up with a vast amount of respect to analytical chemists. There seems to be something about them fascinating and weird. Picture to yourselves, my readers, the grasp of brain that enables a man to be so *au fait* with the subject as to be enabled to predict from its chemical constitution the probable behaviour of phthalein of dibromresorein or tetrabromo-fluorescin! To me it seems as if the very use of such thrilling compounds ought to annihilate time and make exposure absolutely instantaneous. I was talking to one of these demigods the other day, and he showed me a colour which he said was "trimethyliodide of pentamethylated leucaniline!" Now, I wonder what effect that would have, or might be supposed to have, from its composition. Probably Mr. William Crookes's new instrument, the radiometer, might aid in the calculation. What a beautiful and wonderful little apparatus it is! Those of my readers who did not attend the lecture of a former editor of this Journal (Mr. Crookes), at the Royal Institution, last Friday, missed a great treat; for, even if they could not agree with the lecturer's theories, they could not but have admired the ingenuity of invention and the truly marvellous skill of workmanship displayed in the construction of his wonderful apparatus. It is quite possible that a photometer—a real workable instrument for photographers—may be produced on the principle of the one shown.

Free Lance.

FOREIGN NOTES AND NEWS.

The New German Law of Copyright.—The Crown Prince of Germany and the Exhibition of Scientific Instruments at South Kensington.—Herr Fichtner's Asphalte Process.—Dr. Vogel's Collodion Formulæ. — Carbon Printing in Germany.—The Prizes Offered by the Industrial Society of Rouen.

The new law of copyright recently passed by the German Reichstag comes into operation on the 1st July of this year.

The *Mittheilungen* says the Crown Prince and Princess of Germany are taking a lively interest in the success of the exhibition of scientific instruments which is to take place at the South Kensington Museum from the 1st April to the end of September. In order that Germany should be well represented a committee has been formed, under the presidency of Herr Hoffmann, to arrange about the articles to be exhibited. The *Mittheilungen* hopes that photography, in its scientific applications, will make a good appearance.

In *Ackermann's Gewerbezeiting* Herr Fichtner gives an account of a way of producing etchings in relief by asphalte. Select pieces of asphalte which do not melt at 90°, and are difficult to dissolve in turpentine; dissolve five parts in a mixture of ninety parts of benzole and ten parts of oil of lavender; the benzole must be separated by distillation from any impurities that would render it too sensitive to light (?), after which it must be thoroughly drained before being used. The oil must be perfectly free from water. Coat a perfectly clean and smooth zinc plate with the varnish, allowing the latter to run off like collodion; then dry in a horizontal position in the dark. Expose the plate under a negative from twenty-five to thirty minutes in the sun, or three or four hours in the daylight, according to the sensitiveness of the asphalte film, which must be ascertained by experiment. The exposed plate is then developed with rock oil, to which a sixth of its volume of benzole has been added; the oil is poured over the plate and moved about until the whites are perfectly clean; the plate is then washed under a jet of water, dried in the light, and etched with diluted nitric acid. There must be a careful avoidance of air-bubbles.

In his books Dr. Vogel gives the formulæ of his collodions in proportional weights. He now, however, gives them in absolute weight, as follows:—

1. Sodic Iodide Collodion.

(a) Iodising Solution—

Iodide of cadmium	10 grammes.
Iodide of sodium	4 „
Bromide of sodium	3 „
Alcohol	300 cubic centimetres.

(b) Plain Collodion—

Alcohol	500 cubic centimetres.
Ether	500 „
Collodion cotton	20 grammes.

A supply should be mixed and left to clear; then mix 300 c. c. of the iodised mixture (*a*) with 900 c. c. of the second mixture (*b*), which will still leave some of the plain collodion for further use.

2. Equivalent Collodion.

Dissolve ninety grammes of iodide of cadmium in 1,350 c. c. of alcohol; also dissolve seventeen grammes of bromide of cadmium in 270 c. c. of alcohol; filter, and store separately. When required for use mix five volumes of the dissolved iodide with one volume of the bromide solution and eighteen volumes of plain collodion containing two per cent. of cotton.

Since Mr. J. R. Sawyer's visit to Berlin the Berlinese photographers appear to be unable to think or speak of any subject that does not, at least indirectly, bear upon the absorbing topic of the carbon process; and many of them seem to have utilised the dull weather about the commencement of the new year, when so little could be done in glass houses, by comparing experimentally different carbon and silver processes and various transfer papers and other tissues, with the usual differences of opinion as to the merits of the carbon and silver processes. Dr. Vogel has been experimenting on the comparative quickness with which the silver and pigmented papers print; and Herren Prümm and Schaarwächter have obtained better enlargements in carbon from ordinary small negatives of children, taken with a shorter exposure, than they think they should have obtained had they taken them direct of the desired size with the necessary length of exposure. This is quite credible if, as is implied, the necessary exposure would have lasted for five minutes!

The Industrial Society of Rouen, in their lately-published programme, offer, amongst some fifty others, the following three prizes:—A gold medal for a substance which shall be cheaper than egg albumen, and which shall replace it in all its applications to printing; a medal (sort not mentioned) for a process for producing oxygen as an article of commerce cheaper than it can at present be produced; a gold medal for a practical commercial application of photo-engraving to the production of prints. The competing works must be sent to the President of the Industrial Society of Rouen before the 1st of October, 1876, and should be signed. They must bear a motto, and be accompanied by an envelope bearing the same motto, and enclosing the author's name and address.

PHOTOGRAPHY IN COURT.

Action for Misrepresentation: Alwyn *v.* Hughes.—This was an action brought in the Marylebone County Court on the 8th inst., before Mr. Sergeant Wheeler, Judge, in which the plaintiff sought to recover from the defendant the sum of £10, being the amount of a deposit made to the defendant under the following circumstances:—Mr. Searl, solicitor, appeared for the plaintiff, who stated that his client was a photographer residing within the jurisdiction of the court, and the defendant was carrying on a similar business in the vicinity of Stamford Hill, which he advertised as being anxious to dispose of. Having advertised in the papers his client answered the advertisement, and subsequently, in December last, had an interview with the defendant, and it was at that interview his client, at the suggestion and upon the representation of the defendant, was induced to part with the sum now sought to be recovered.—Edward Evans said he was present at the interview between the plaintiff and defendant,

when the defendant said his business was worth £150 net, and suggested that the plaintiff should pay £10 to clench the negotiation.—This was the plaintiff's case, when Mr. Searl urged that the representation made by the defendant was entirely false, as it was found that upon inquiry the business for which his client was to pay £150 was in fact worth nothing, and the plant, which was to be taken at a valuation, was protected by a bill of sale.—The defendant denied this. He said that his business was well worth the money, and he merely wished to dispose of it as he was going into the country—The defendant called a witness, who said that the business was a good one, but he could not say what it was worth, nor was he present when the defendant represented its value to the plaintiff.—The Judge said it was a case of oath against oath, and therefore he should nonsuit the plaintiff, under the new act, and give him leave to sue again, as he did not like the evidence as to the bill of sale.

Prosecution of a Fraudulent Bankrupt at Scarborough.—On Wednesday, the 9th inst., at the Scarborough Borough Police-court, William Ernest Campbell, *alias* William Cuthbert, was brought up in custody charged with several offences under the Bankruptcy Acts, and who had been ordered to be prosecuted by the learned Judge of the Scarborough County Court on the previous day. Mr. Crowther prosecuted.—It appears that the prisoner carried on business in Scarborough as an albumenised paper manufacturer. When he came to Scarborough he had between £60 and £70. This was in August, 1874, but at that time he said he owed between £2,000 and £3,000, money expended in defending some alleged claim to certain shares in Venezuela mines. He advertised for a partner in a "lucrative business," and he induced Mr. Webster, the petitioning creditor under the bankruptcy, to lend him £200. The business prospered, but the bankrupt, on the 27th of November, sold it to Mr. Burford for £450, and between August and that date he received about £140 from his business. Instead of paying his creditors the prisoner decamped, taking with him eight boxes of goods, which he left at King's-cross Station, London, in a fictitious name. He confessed that he had made inquiries about quitting England for Calcutta, and had actually left his address in Calcutta with a friend in Scarborough. He was apprehended in London. It was found that the boxes, which weighed eight cwts. when they left Scarborough, only weighed about four cwts. when recovered, and that some of them had been emptied and filled with straw and rubbish. In the cash-box were a number of farthings—intended to represent sovereigns—and the accused admitted that he had torn leaves out of his bank-book, mutilated his cash-book, and put fictitious invoices in his other books to deceive his creditors. He had also made fictitious entries in his day-book. The prisoner was remanded for eight days, but bail was allowed, himself in £40 and two sureties of £20 each.

Meetings of Societies.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.

At a meeting ef this Society, held on Tuesday evening, the 8th instant, the Secretary read the following

REPORT OF THE COUNCIL.

In presenting its Annual Report to the Society the first Council elected under the new rules, by a ballot of the whole of the members of the Society, has to congratulate them on the material progress which the body it has the honour to serve has made.

During the year which terminates to-night twelve papers have been read (including that to be read this evening), one less than the number read in the preceding year; and, though it is to be regretted that an increase has not been made in the quantity, your Council can point to the very great value of the communications made.

At the same time your Council desires to impress on the members at large the urgent necessity of their use of every effort to support the Society by obtaining an increased amount of original matter to be read before it in the shape of papers, and to point out that, as the Society deals with photography as a whole, there is room for papers on the scientific and artistic aspects of photography as well as on its manipulatory details, though the latter seem to engage the larger share of the attention of photographers. Numbering in our body, as we do, the most distinguished amateur and professional photographers of the United Kingdom, we ought surely to be able to obtain a larger number of papers.

Turning to the exhibition, your Council can congratulate you on an unprecedented success, and may safely say that never before did the exhibition attract so much attention from the non-photographic public and the public press. Of the financial aspect of the exhibition the Treasurer will render a favourable account in his report, while of the other aspects the annexed analysis, by our Assistant Secretary, Mr. Edwin Cocking, to whose aid your Council are greatly indebted, will present an interesting view:—

"The pictures exhibited were contained in 426 frames, comprising 1178 different photographs, of which 677 were portraits, 290 landscapes and buildings, and 211 miscellaneous subjects. There were 113 enlargements, consisting of 71 portraits and 42 landscapes.

"The countries represented were England, Wales, Scotland, Ireland, France, Germany, America, and New Zealand.

"There were 92 exhibitors, of whom 43 were members and 49 non-members.

"The exhibitors consisted of 71 professional photographers and 21 amateurs.

"Of the 71 professional exhibitors 33 were members and 38 non-members.

"Of the 21 amateur exhibitors 10 were members and 11 non-members.

"Of the 92 exhibitors 36 were from London, 50 from the country, and 6 foreigners.

"Of the 36 London exhibitors 18 were members and 18 non-members.

"Of the 18 London member exhibitors 16 were professional and 2 amateurs.

"Of the 18 London non-member exhibitors 13 were professional and 5 amateurs.

"Of the 50 exhibitors from the country 25 were members and 25 non-members.

"Of the 25 country member exhibitors 16 were professional and 9 amateurs.

"Of the 25 country non-member exhibitors 19 were professional and 6 amateurs.

"There were 18 London member exhibitors and 25 country member exhibitors; 29 London professionals and 33 country professionals; also 7 London amateurs and 15 country amateurs."

Your Council thinks that the above analysis will show the members the direction in which to seek for recruits for the Society.

Turning again to a pleasant subject, your Council has to congratulate you on our removal to these premises, the use of which for our meetings and exhibitions has been secured, and to express a hope that this arrangement will conduce to the improvement and success of the Society. This will place the Society in a position to guarantee an annual repetition of the exhibition.

During the year your Council has to record with great regret the deaths of their distinguished colleague, Sir C. Wheatstone, and of Mr. Charles Vignoles (both of them original members of the Society, though the latter was not a member at the time of his decease), Mr. A. Boucher, of Brighton, Mr. Price P. Baly, Mrs. A. C. Palmer, Mr. Window, and their invaluable collector, Mr. S. T. Davenport.

The following is a list of papers read during the year:—

Photographic Operations in Egypt in Connection with the Late Transit of Venus. By Captain W. de W. Abney, R.E., F.C.S.

On a Dry-plate Process for Solar Photography. By Captain W. de W. Abney, R.E., F.C.S.

On a Method of Enlarging. By Valentine Blanchard.

Photography in Permanent Pigments, with Recent Improvements in Autotype Transfer. By J. R. Sawyer.

On the Comparative Sensitiveness of Various Photographic Processes. By Lieut.-Colonel H. Stuart Wortley.

The Advantages of Sulphocyanide of Ammonium as a Fixing Agent. By George Hooper.

Note on the Production of Sulphocyanides. By John Spiller, F.C.S.

On the Manipulation of Large Plates in the Field. By Edward Viles.

On Some Photographic Matters. By Lieut-Colonel H. Stuart Wortley.

Action of Eosin on the Photographic Spectrum. By Captain J. Waterhouse, B.S.C.

On Photographs Taken in Connection with the Arctic Expedition. By H. Dixon.

On Investigations Relative to the Emulsion Collodion. By Leon Warnerke.

The Treasurer then read his financial statement of the affairs of the Society, as follows:—

BALANCE SHEET OF THE PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN
For the Year Ending 31st December, 1875.

CASH ACCOUNT.

1875. Receipts.	£	s.	d.	1875. Payments.	£	s.	d.
To Balance	144	7	7	By General Expenses	64	17	1
,, Entrance Fees and Subscriptions	327	10	0	,, *Soirée* expenses at the opening and closing of the Exhibition	30	15	3
,, Sale of Journals and Advertisements	23	5	3	,, Journal Account and Assistant Secretary's salary	124	0	7
,, Admission to Exhibition and sale of Catalogues	137	1	9½	,, Expenses of Exhibition	132	12	6
				,, Balance at Bankers	279	19	2½
	£632	4	7½		£632	4	7½

ASSETS AND LIABILITIES.

1875. Assets.	£	s.	d.	1875. Liabilities.	£	s.	d.
Entrance Fees and Subscriptions due. £121 16 0 Say less 20 per cent. 24 7 2	97	8	10	General outstanding Expenses, estimated at	10	8	1
Advertisements outstanding, Journals in stock, &c. (say)	39	7	3	Balance in favour of the Society	419	12	3
Cash balance at Bankers	279	19	3				
Cash in Taylor and Francis's hands due to the Society, Advertisement Account	13	5	0				
	£430	0	4		£430	0	4

Audited and found to be correct,
(Signed) J. C. HEAVISIDE, R. C. MURRAY, } Auditors.
January 31, 1876.

SOUTH LONDON PHOTOGRAPHIC SOCIETY.

An ordinary meeting of this Society was held on Thursday, the 10th inst., the Rev. F. F. Statham, President, in the chair—a position which, after the reading of the minutes, he vacated in order to read a paper *On Magnitude as an Element of Attractiveness in Photography.* [See page 78.] The chair, in the interim, was occupied by Mr. William Brooks.

Mr. J. T. Taylor said that from an observation in the paper relative to the *carte* it might be supposed that their President considered it as being the initiative element in the dimensions of photographs. But many years previous to the introduction of *cartes* portraits of large

dimensions had been produced, the *carte* being rather a retrogressive step; for at the time it was introduced direct portraits were taken of dimensions up to eighteen inches. With respect to the exaggeration alleged to be the concomitant or attendant of every effort to produce an enlargement from a small negative the contrary was, in his estimation, the case; for, while it was all but impossible to take a *direct* portrait on life scale which would be free from exaggeration, the latter was entirely absent in the case of an enlarged picture produced from a suitable *cliché* of small dimensions. To adduce an extreme instance:—A few years ago he saw, at the residence of Professor Piazzi Smyth, the Scottish Astronomer-Royal, a transparency in size about ten inches, although of the precise dimensions he was uncertain. But that transparency had been enlarged from a negative of only one inch in size, and, so far as he recollected, it was somewhat more perfect—both with regard to sharpness and soft gradation—than several large pictures of the same subject which had been taken direct. In contrasting photographs with the pictures exhibited at the Royal Academy their President had for the moment lost sight of the fact that pictures of noble dimensions had found a place on the walls of some of the photographic exhibitions. He was very much afraid that the imagined colossal camera and lens desiderated by their President would still have to remain in embryo. Already cameras of enormous dimensions had been constructed, with lenses on a scale commensurate with the requirements of such cameras; but the objections to their use so far outweighed their advantages that no one now ever thought either of constructing or using them. The proposal to imitate the human eye in the construction of a large lens he might meet by quoting an observation made by Professor Clifford at the Brighton meeting of the British Association. That gentleman stated that no optician of reputation would think of imitating such an optically-imperfect instrument as the human eye; and, viewed merely from the photographic-lens point of view, it was certainly very imperfect. But of whatsoever material—whether glass or fluid—the lens was composed it should be borne in mind that the dimensions of the image were determined by its focal length, not by its size; although it was doubtless true that, especially in portrait lenses, length of focus must be accompanied with largeness of aperture, in order that sufficient light be transmitted. It was this increase of aperture that militated against success in portraiture, the parts situated on one plane of representation being in focus while all other parts were indistinct.

Mr. J. Tulley thought that, owing to the great sensitiveness of plates prepared with gelatine, it might be possible to utilise them in obtaining large direct pictures with lenses closely stopped down, so as to ensure the requisite depth of definition.

Mr. Brooks (Chairman *pro. tem.*) thought photographers were mistaken in using an iron developer in the production of negatives which were to be afterwards used for enlarging, as that gave a greater degree of granularity than when an alkaline pyro. developer was used. With respect to the question of enlarged *versus* direct pictures, any direct photograph over 15 × 12 he considered quite a mistake. The present mode of lighting studios, too, was a mistake, for it was indeed very seldom that one saw his friend under such conditions of lighting as prevailed in the studio. In connection with the production of enlargements he thought it would be a good plan if two portrait lenses of similar size were used, one of them placed somewhat behind the other, so that the image which was produced by one should be magnified by the other without having to take a negative as an intermediate condition.

Mr. Taylor said he had found that the granularity of the deposited silver, of which a negative was composed, interfered less with the production of a perfect enlargement than did the falling away of the sharpness irrespective of granularity. The optical shortcomings of portrait lenses interfered more prominently than did the chemical constitution of the image. He (Mr. Taylor) then demonstrated, by a diagram on the black board, the impossibility of the production of an enlargement by such an arrangement of lenses as that proposed by the Chairman. [An article on the subject will be found at page 74 of the present number.]

Mr. E. W. Foxlee corroborated Mr. Taylor's remarks relative to large portraits having been taken long before the introduction of the *carte* portrait. For some years previous to that time he had regularly used a large Voigtländer lens for producing portraits eighteen inches in dimensions. Enlarged portraits were certainly more free from distortion than those taken direct, and the most suitable size of negative for producing a good enlargement was one of about five or six inches.

Mr. Wilkinson observed that the dimensions and focal length of the lens to be used in producing an enlargement were of no consequence so long as the negative to be enlarged did not exceed the capabilities and scope of the lens. It might, and sometimes with advantage, be allowed to come very far short of those capabilities.

Mr. L. Warnerke, referring to a remark made by Mr. Taylor about Professor Piazzi Smyth's Egyptian views, said that he understood they had been taken by means of a very costly apparatus.

Mr. Taylor replied that such an apparatus need not be very costly; the lenses used by Professor Smyth were of the kind well known as locket lenses, the cost of which was not great.

After some other remarks a vote of thanks was by acclamation conveyed to the President, who, in reply, observed that his paper had been hastily written to stop a gap for that evening, and he was pleased to find that it had elicited such a hearty discussion.

Mr. Warnerke then exhibited a glass tap of a convenient form, which, he said, was sold at a very cheap rate at some of the furnishing shops in Holborn.

The meeting was then adjourned.

MANCHESTER PHOTOGRAPHIC SOCIETY.

The monthly meeting of this Society was held at the Memorial Hall, on Thursday evening, the 10th instant,—Mr. W. T. Mabley, President, in the chair.

Mr. D. Young exhibited an elaboration of Mr. M. Noton's oxygen generator and lantern-stand for producing gas at the same time it is being consumed in the lantern. Mr. Young exhibited by means of this apparatus a number of slides of the Polar expedition. He (Mr. Young) said he thought it was admitted that if gas-holders could be made more portable they were very much better than gas-bags. In this apparatus he thought this great objection to gas-holders was entirely got over, and many advantages gained which we could never have had with gas-bags. In the first place, this apparatus occupied only about one-tenth the usual space; it could be put to work in any place where an ordinary chair could be placed, and had also this very great advantage—*one person* could manage the lanterns, slides, and gas apparatus. One pennyworth of oxygen could be made for enlarging, or a pair of lanterns could be kept supplied for any length of time, and there need never be more than half a cubic foot of oxygen on hand. He had kept oxygen for six weeks, and believed it would keep six months, which, he thought, was not often done in gas-bags. The lanterns (mahogany-covered biunial), four and a-half-inch condensers, extra large telescopic brass fronts, 100 feet of tubing, limes and oxygen mixtures for society entertainments, and the whole of the gas-holders and apparatus, pack in a space of about *two feet long and fifteen inches diameter*, and could be unpacked and put in working order in four or five minutes, then occupying only about one square foot. Being on small wheels it could be moved to or from the screen or sensitive surface, which, he thought, would be found very convenient for enlarging. With an apparatus of this size he could supply oxygen sufficient for *four* biunial dissolving lanterns, and he hoped to have one completed soon that would supply *forty*. He had almost forgotten to say the gas apparatus was suitable to any lantern, and he had a special arrangement for the sciopticon, which, he thought, would add largely to its usefulness and only about half-an-inch each way to its present bulk. This he should be happy to show at a future meeting if the members desired it. The slides shown were taken by Mr. Henry Dixon, of London, from the 12 × 10 negatives referred to in the paper he read before the London Photographic Society, and fully reported in the Journal of January 21st, in which he described in a very pleasant and instructive manner the difficulties he encountered and how he got over them.

Mr. Woodward exhibited some slides on wet collodion plates, developed with iron, bleached with chloride of copper, and redeveloped with alkaline (liquor ammonia) pyrogallic acid. The colour of these slides approximated to that warm tint so much admired in the Ferrier slides for the stereoscope.

Mr. Pollitt showed some slides produced in the same way as Mr. Woodward's, but blacker in tone, owing to a difference in the time of exposure.

Some of Mr. Pollitt's stereo. slides were backed with an imitation ground glass produced by coating the back glass with a mixture of iodised collodion and negative varnish. The effect was very good, and much finer than any ground glass.

Mr. A. Brothers, F.R.A.S., V.P., exhibited on the screen (paper) some dozen or more lantern slides from negatives by the late Mr. Breese, and stated that some of the pictures, including water and clouds, were printed from one negative.

A large number of Mr. Coote's excellent lantern slides were then shown, and the proceedings closed with the usual votes.

Correspondence.

ACCELERATORS AND ORGANIFIERS.

To the Editors.

Gentlemen,—The question lately raised in one of your leading articles, and commented on by Colonel Stuart Wortley and yourselves in your last number, is a most interesting one.

The question referred to is—"Can an organic addition to an emulsion of bromide of silver increase its sensitiveness?" From my experience I should have been ready to have answered in the affirmative were it not for a consideration suggested by some remarks of yours last week.

You say:—"As we increase the rapidity of the collodion emulsion it becomes necessary to employ a fog restrainer, which, in all probability, also exercises a retardent influence upon the sensitiveness, thus preventing us passing a certain point. * * * * It remains now to discover a 'fog restrainer' which does not possess the property of impairing sensitiveness."

I most cordially agree with your *dictum* of the direction in which we must look for improvement.

To write as briefly as possible, I may say I have obtained more sensitive films when using lactate of silver in the emulsion than when only the bromide or chloro-bromide were present—a fact which at first sight would lead one to believe the lactate had increased the sensitiveness of the silver haloid; but I am now disposed to think the results I obtained were due to the lactate acting as a fog restrainer without materially detracting from the sensitiveness of the other salts. On thinking carefully over my old experiments they mostly seem to point to this conclusion.

The lactate does undoubtedly prevent fog in an emulsion (with excess of silver nitrate) which has been got into a state of exalted sensitiveness. The question is by no means a settled one, and, like Colonel Wortley, I am still open to conviction one way or the other.

Meanwhile it behoves us all to make an intelligent use of the few scraps of knowledge we already possess, and thus help forward the "science" of photography.

For too long a time there has existed, especially among dry-plate men, an unfortunate habit of experimenting in a haphazard kind of way, without any clear idea of what they are aiming at. Hence results a great deal of the empiricism so prevalent amongst us, and the few signs of really scientific work which we are able to discover. Let us hope better days are in store.—I am, yours, &c.,

Homehurst, Torquay, February 11, 1876. HENRY COOPER.

EXPERIMENTS WITH MR. M. CAREY LEA'S PROCESS.—KEEPING OF GELATINE EMULSIONS.

To the EDITORS.

GENTLEMEN,—In *Foreign Notes and News*, page 68, it is recorded that M. Champion and another member of the Photographic Society of France had prepared some chloriodo-bromide pellicle, after the manner described by Mr. M. Carey Lea, and that they had only succeeded in producing an insensitive and, in one case, *insoluble* compound; and you give them a gentle prick for not being better acquainted with the working of washed emulsions. Well, doubtless many of us, including myself, ought to be "better up" in the matter; but I am inclined to think that perhaps, after all, we have not fallen very easy victims to the difficulties of Mr. Lea's process.

I have tried to prepare six ounces of the emulsion, believing, of course, that I should succeed. (Presumption is great before a fall!) Everything seemed to go right before the drying of the pellicle. Clots of the silver salts certainly did form in adding the silver nitrate, but they mostly disappeared after standing and shaking. This, it will be remembered, was the Editors' experience last spring. Clots were also the result of adding the cobaltic chloride, but they, also, were dissipated in the same way.

The pellicle did not seem to change colour at all on adding the organifier, which remained in contact with it for twenty-five minutes. The pellicle was then washed; and here, I think, I may have slightly erred, but hardly so as to cause the failure I am about to describe.

The pellicle, when put into the drying closet, was of the colour of an ordinary emulsion—that is, it was *not* discoloured; but, when dry, it had a cold, grey tint. This, when dissolved, I found to be just as insensitive as M. Champion describes his pellicle to be. For instance: instead of one second's exposure to a gas flame being sufficient I found fifteen minutes hardly enough to give a trace of the image (a paraffine lamp being used). Half-a-minute, or even a minute, was not too long in fairly strong daylight. The emulsion by *reflected* light does not incline to yellow, but rather to a light drab. The light transmitted through it is orange. I am inclined to think that I have noticed the fact of an insolubility of a little of the pellicle. The organifier, after using, was allowed to settle and then poured off, leaving a powdery residue behind; this, when dried at a somewhat (I am afraid) too great heat, refused to a great extent to dissolve. I do not think that the insoluble portion is albumen thrown down by the silver nitrate. I have said that I may have erred in the washing. I should say that I have reason to believe that all the organifier was not washed out. This would probably account for the insolubility, as sufficient albumen may have coagulated by the heat to produce this result. Still I cannot account for the insensitiveness of the greater bulk of the emulsion. I intend to "try, try again;" and this time I shall prepare a plate or two with the emulsion before pouring out, using the Lea organifier.

You have expressed an opinion that organic substances do not increase the sensitiveness of an emulsion. For what purpose, then, do we use nitrate of silver in excess unless for the purpose of acting on organic substances in the collodion? It may be said that we only apparently gain sensitiveness by increasing the capacity for density; but it is generally conceded that an emulsion prepared with excess of silver is more sensitive in the ratio of that excess. When a soluble bromide is in excess I do not think that the sensitiveness is increased by an organifier. I believe that Mr. Lea's opinion is that organic compounds of silver increase the sensitiveness.

I have been trying to overcome the inconvenience of the bad keeping properties of gelatine emulsions—one of the principal defects of the gelatino-bromide process—and believe I have succeeded by a method not before published in this connection. I have added one grain of chrome alum to every hundred grains of gelatine used in the emulsion—that is, one per cent. The emulsion I experimented with was a chloride one prepared about a fortnight before. I used an alcoholic solution of pyrogallol, adding so many drops of that to the watery developer. Both plates (that is, one with and one without the addition of chrome alum) did very well (as a decomposed emulsion sometimes will) till the developer was applied, the plates being placed together in a dish; then the plain gelatine went to the bad, as gelatine workers know too well, but the other (chrome alum) remained in good order.

I then wished to repeat the experiment with another emulsion; so I took some "Kennett" emulsion prepared four months ago. It had received an addition of a decoction of cloves, and about half-an-ounce remained in a three-ounce bottle. Plates were prepared from this in the same way, and, curiously enough, the chrome alum blistered a little in the centre of the plate, while the plain one remained intact. The failure with the chrome-alum plate was probably due to dampness of the blistered spot. It is not usual for gelatine emulsions to keep so long as this; perhaps the clove extract may have something to do with it.

I now took a gelatino-chloride emulsion prepared about a year ago, likewise treated with cloves. Two plates were prepared—one with and one without chrome alum. The latter did certainly pucker a very little near one edge, where the emulsion had thickened; but the former remained in perfectly good order. We do not, as a rule, find gelatine emulsions "keep," like this, for so long as a year.

But these two last experiences have not helped me much as regards the virtue of chrome alum as an addition to a gelatine emulsion; still they have served to show that the loss of sensitiveness will be very small, if, indeed, there be any. I should much like to know whether any other worker uses an alcoholic solution of pyro. for gelatine plates, as I understand Mr. Kennett to mean that whenever he has used a trace of alcohol in his developer the result has been much the same as if the emulsion were decomposed; hence I know that he makes it a *sine quâ non* not to use alcohol.

Let me here thank Captain Abney for his letter. He says that iodine will replace bromine; Mr. Robinson says that iodine, *per se*, will not. Some of us, not excepting myself, seem to be "all at sea"!

A soluble chloride seems, from all the evidence, to be the only form of haloid that will not replace the kindred halogens in their combinations with silver, except that a soluble bromide will not replace iodine. Am I not right in this view of the case?—I am, yours, &c.,

Cotheridge Court, Worcester, February 14, 1876. HERBERT B. BERKELEY.

[We embrace this opportunity of adding a few words on the subject of Captain Abney's communication in our last number, to which Mr. Berkeley here makes reference. One of our articles in the number for July 12, 1874, *On Some of the Less Known Methods of Producing Opalotypes*, is devoted to a description of the method of substituting one haloid for another; and in a sub-leader, in the following number (page 289), further particulars are given.—EDS.]

RESTRAINERS IN SENSITIVE EMULSIONS.

To the EDITORS.

GENTLEMEN,—You ask for information as to restrainers for use in very sensitive emulsions.

You are aware that one of the most valuable restrainers is *gelatine*. It *restrains* chemical action without producing insensitiveness, and in an emulsion is of great use in that direction. Being soluble, as it is, in hydrochloric, sulphuric, acetic, and other acids we have various ways of adding it, and if you think it will be of interest to your readers I shall be glad to give you details of the proportions and methods of adding this substance.

A combined collodio-gelatine emulsion is then formed, and by making use of the fact that gelatine containing bromide of silver is soluble in weak alcohol we can bring the gelatine into use in almost any proportion required.—I am, yours, &c., H. STUART WORTLEY.

February 15, 1876.

[Such details *would* prove interesting to our readers.—EDS.]

"THE BARONET'S STAND."

To the EDITORS.

GENTLEMEN,—Of course I cannot give any opinion as to the good qualities of Mr. Kennett's camera-stand, not having seen it. I can only judge by the description, which represents the legs to have grooves and rebates; and from my own experience, with my *smooth* legs, I should say that this would not answer. I do not see how, with his "screwless" stand, he can render it so rigid at the top, or anywhere, without screws as mine can be rendered with them without danger of sticking.

With regard to the "extra piece of wood" at the top, it is a necessity, as I explained to you before, to suit my own particular camera; it can be modified to suit other cameras. You will observe that there are dowels on the top on which the camera fits, and it could not be turned, without the present arrangement, unless the stand were moved also. Under any circumstances, however, I consider some such plan most decidedly advantageous.

Perhaps Mr. Kennett has not had so much experience as I have had, in extremely difficult positions, in a southern climate, with rapidly-changing light, and often no time to move and re-level the camera before the shadows may have so altered as to render a different point of view desirable. I have found the rotating block of the utmost use, as it must be remembered that it is perfectly level and true, which I do not believe any ordinary screw arrangement can possibly be. I am glad that my idea of tilting the camera is liked.

As regards portability, I never dismount my camera-stand. It always travels as I sent it to you, and has been a great many hundreds of miles (I may say thousands) in that form. It goes along with the umbrellas, &c.—I am, yours, &c., T. H. Parkyns.

Harnham Cliff, Salisbury, February 14, 1876.

P.S.—I often put things inside the legs and strap them all up together. This proves most convenient, I can assure you. My stand has been proved by much hard work. Has Mr. Kennett's? I never lost a screw or had the least trouble. His wedges, ferrules, &c., would inevitably stick, so far as I can form an opinion, and require a hammer to move them.—T. H. P.

SUGGESTIONS FOR A PHOTOMETER.

To the Editors.

Gentlemen,—Last Friday evening a most interesting lecture on *The Mechanical Action of Light* was delivered by Mr. William Crookes in the theatre of the Royal Institution. By the aid of many delicate experiments light (entirely apart from heat) was amply demonstrated to have a mechanical effect of weight, or push capable of being estimated in weight. The experiment of weighing the light of a candle was actually performed. The mechanical action of the sunlight was calculated to be about equivalent to eight hundredweight per acre. Mr. Crookes had also found in the course of his investigations that objects delicately balanced *in vacuo* were caused to rotate by the impact of a beam of light, and an ingenious yet simple contrivance was exhibited by which each revolution so caused could be registered, and thus a complete and continuous index of the amount of light obtained during a given space of time.

Now this immediately suggested to my mind the application of the principles here involved to the construction of that much-desired instrument—an efficient and practical actinometer. It is true, perhaps, that the actinic intensity of light is not in direct ratio with its luminous intensity; nevertheless, the investigation of the subject from the point of view which I have indicated appears hopeful.—I am, yours, &c.,

February 14, 1876. H. Wilson.

EXCHANGE COLUMN.

I will exchange six capital lenses and new binocular camera, all complete, with printing-frames and dishes and other apparatus, for a wide-angle lens of seven or eight inches focus.—Address, H. F. Z. George, Bracknell, Berks.

Fifty good view negatives, quarter size, of places of note, in plate-box, and Towler's *Silver Sunbeam*, eighth edition, new, for exchange. Photographic offers requested.—Address, Daniel Breare, Burley-in-Wharfdale, near Leeds.

ANSWERS TO CORRESPONDENTS.

☞ *Correspondents should never write on both sides of the paper.*

C. Triptree.—Exchange inadmissible in its present form.

——— (Frazerburgh—name undecipherable).—To remove the stains apply a strong solution of cyanide of potassium in which iodine has been dissolved.

W. C.—The portable camera offered to you is doubtless a very excellent one, if we may judge of it by others sent out from the same establishment.

Dopple-Ganger (Edinburgh).—We had previously heard of the circumstances to which reference is made; but we have not yet been in a position to satisfy ourselves as to the facts of the case.

Omicron.—Mr. Lea's directions are to dissolve the cupric chloride, together with the iodide and bromides mentioned, in the solvents, then adding the pyroxyline, and after that the *aqua regia*.

Thomas Chilton.—1. There can be no objection to your making use of the process, as described, for your own private practice.—2. The appearance will be darker than that of the Liverpool plates.

S. Wilkey.—We are unable to say what kind of varnish is best, but you can obtain the information from any practical lithographer, or at any of the warehouses where lithographic materials are supplied.

J. Jennings.—The explosive mixture referred to is composed of equal parts of chlorine and hydrogen. Exposure to the light of the magnesium flame will explode this mixture in quite as satisfactory a manner as sunlight would do.

James Pearce.—The subject of the "continuating rays," as applied to the daguerreotype process, is one about which very little is known. A brief exposure to actinic light sets up an action which is "continued" by red or orange light.

L. D. (Colne).—The mottled appearance of the prints, as well as the dissolving off of the albumen, was caused by the weakness of the silver bath, the albumen being soluble not only in water but also in a *weak* solution of nitrate of silver. In this you will discover the cause of the want of gloss.

J. B.—1. Let the negative be made as intense with the pyrogallic acid and silver as you can, and then treat it with a solution of bichloride of mercury, allowing the action to continue until the deposit is white. Now apply a solution of either cyanide of potassium, hyposulphite of soda, or sulphide of ammonium.—2. The cutting was received, with thanks; but the crowded state of our columns of late has prevented us from yet being able to make use of it.—3. We are not aware of the price of the actinometer recently described by our Paris correspondent, Professor Stebbing.

Astronomicus.—Without giving a definite answer to your question, "When and by whom was the telescope invented?" it may be sufficient to state that, although its invention is assigned to the seventeenth century, it is certain that the effect of lenses, when formed into combinations, was known four centuries before that period.

Lionel.—Our correspondent writes:—"At page 71 the French correspondent of The British Journal of Photography, speaking of M. Boivin's process, asks for information as to its prior publication. If he refer to Mr. Sutton's *Photographic Notes* for 1863 he will find, at page 212, a description of a similar process, by Ch. D'Orma, seemingly translated from a foreign journal. At page 305, same volume, the Rev. W. Williams, of Lisbon, describes his experiments in the same direction; and the editor also gives the results of his experiments as being favourable."

Rondi.—The desiccation of albumen is by no means the difficult task you imagine it to be. The last we prepared was treated in the following manner:—The whites of four eggs were beaten into a slight froth, and the liquid was then poured out upon plates of ordinary tinware, and thoroughly dried. It was then stripped off, broken into small pieces, and placed in a bottle. In this condition it is always ready for use, as soon as the required portion of it has been dissolved in water. Of course it must not be subjected to much heat while being dried, as that would cause the albumen to become coagulated, or insoluble in water.

E. M. H. (Andamans).—1. The reason why the whole of the figure is not sharp to an equal extent is that the angular aperture of the lens is too large; it must be diminished by the insertion of a diaphragm. But, as the exposure is increased by doing so, the diaphragm selected should be the largest by which the required depth of definition is obtained.—2. The precise quantity of chalk to be added must be determined by the degree of acidity of the solution. A large excess will do no harm.—3. The position of the prints does not influence the rapidity of action.—4. Better avoid any subsequent addition of nitrate of soda to the sensitising bath. It is, however, quite impossible to ascertain the strength of the bath by the argentometer; it will be necessary to have recourse to the volumetric method of doing so.——Our correspondent suggests, as a remedy for blisters in albumen prints, the rolling of them, while in a slightly moist condition, with a bottle containing very hot water, and he encloses a print which has undergone successful treatment by this simple method.

Crowded Out.—We have in type communications from M. Carey Lea, E. Dunmore, E. B. Docker, D. K. Griffith, "Mark Oute," J. Lessels, "L. S. D.," and L. Warnerke. With respect to the paper by the last-named gentleman, we regret to have been compelled, owing to its extreme length and the late hour at which we received the "copy," to defer its publication till next week.

South Kensington Museum Photographs.—Mr. F. York has sent us the first part of a series of photographs of various works of art taken by him in the South Kensington Museum, and now being published by him with the sanction, and under the auspices, of the Science and Art Department of the Committee of Council on Education. Part I. contains four exceedingly choice subjects, which will be instantly recognised by those who have visited the Museum. Among these will be found the *Pulpit from a Mosque in Cairo*, the *Eastern Gateway of the Sanchi Tope*, and others. Each photograph is accompanied by a page of descriptive letterpress; and, when we consider the singular beauty of the photographs (which are printed in Woodburytype), and the excellent style in which the whole is got up, we wonder much that four such pictures can be sold at so moderate a sum as one shilling. The work is to be completed in twenty parts, each containing four photographs, a list of which, compiled by the Committee of the Council, is published. The demand for such a work will necessarily be very extensive.

LONDON GAZETTE, *Friday, February* 11, 1876.

February 15.—J. P. Starling, Brunswick-place, Blackheath, Photographer. Public Examination.

METEOROLOGICAL REPORT,

For the Two Weeks ending February 16, 1876.

Observations taken at 406, Strand, by J. H. Steward, Optician.

These Observations are Taken at 8.30 a.m.

Feb.	Bar.	Wind.	Wet Bulb.	Dry Bulb.	Max. Tem.	Min. Tem.	Remarks
3	30·37	W	38	40	50	35	Cloudy
4	30·00	NW	36	37	44	35	Cloudy
5	29·95	N	35	36	41	32	Dull
7	29·86	E	33	36	39	33	Dull
8	29·94	N	34	35	38	33	Dull
9	29·89	NE	33	35	—	31	Dull
10	29·95	NE	—	32	36	28	Foggy
11	29·92	SE	—	29	32	26	Foggy
12	29·92	NW	—	30	33	25	Foggy
14	29·61	NW	—	36	48	25	Dull
15	29·53	W	47	48	53	35	Dull
16	29·71	W	45	49	—	43	Dull

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THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 825. Vol. XXIII.—FEBRUARY 25, 1876.

EMULSION INVESTIGATIONS.

At the last meeting of the Photographic Society of Great Britain Mr. Warnerke read a paper upon this subject, which was well described as "the most valuable that had been heard for a long time." Mr. Glaisher, in the course of his opening remarks, referring to the object of the Society, stated it to be "emphatically the advancement of photographic science," which, he went on to declare, consisted in something more than the mere taking of pictures. A better explanation of what is the real meaning of photographic science could scarcely be found than that gained by a perusal of Mr. Warnerke's able and comprehensive paper, and that gentleman has most decidedly added one more to the list of obligations under which emulsion workers rest to him.

As our readers are aware, Mr. Warnerke has previously devoted much valuable time and thought to the various improvements in emulsion photography, and, recognising the possible advantages to be derived from the recently-introduced "organic pyroxyline," has laid himself out to carefully investigate its characteristics. The result of his researches will be found detailed in his paper in another column, which commences with a consideration of the variety which exists in the quality and characteristics of different samples of pyroxyline, and how they are produced. Mr. Warnerke recognises the fact, as others who have worked the washed emulsion process have done previously, that a sample of cotton which gives the best results when employed in the ordinary manner is frequently not suitable for the washed method. We have attempted, upon previous occasions, to account for this difference of action under apparently similar chemical conditions, and it is now certain that something more is necessary than mere porosity or powderiness of the collodion film, inasmuch as a slightly "horny" collodion is found to give the best results when washed.

Porosity may, however, be of two different descriptions. Hitherto we have been in the habit of seeking after a "powdery" pyroxyline, giving a film capable of absorbing into its pores a certain quantity of gummy matter, which preserved the absorbent character of the film when dried. Such samples of pyroxyline, however, if dried without treatment with a preservative, only too frequently are found to shrink up into a hard, skinny film of so repellent a nature as to be almost impermeable to the developing solution. In the case of a washed emulsion, however, which contains no soluble matter whatever, it is obvious that a different class of film is necessary, and it is here that the second description of porosity is made evident. A washed emulsion, when made from a suitable pyroxyline and without any addition of soluble matter, may be dried into a thin and perfectly homogeneous skin, which, upon being again moistened, possesses almost, if not quite, the same absorbent power it did previous to drying. This effect, however produced, is evidently a molecular arrangement of the film, dependent upon the strength and temperature of the acids, and probably upon other conditions, as suggested by Mr. Warnerke. An analogous molecular re-arrangement is to be found in the comparison between the properties of a sheet of bibulous paper before and after treatment with dilute sulphuric acid; before such treatment the paper absorbs water with the greatest avidity, but after its transformation into the so-called "vegetable parchment" it becomes, without chemical change, as impervious to water as pure animal membrane.

Mr. Hardwich was the first to avail himself, for photographic purposes, of the parchmentising effect of sulphuric acid upon cellulose, and showed that a certain proportion of this parchmentised principle is necessary to the production of an intense image, while, at the same time, it tends to the formation of a firmer and more solid film, the pyroxyline being, at the same time, less easily soluble in the ether-alcohol mixture. Upon the due relation between the "horny" and "powdery" principles, therefore, may be said to depend the working properties of the collodion, the exact requirements varying greatly according to circumstances—as, for instance, in the cases respectively of wet and dry plates, bath and emulsion plates, and even with different preservatives. For washed emulsion purposes, again, a special kind of pyroxyline is necessary—a more "horny" sample, possessed at the same time of highly organic reactions with silver, having been found to produce the best results.

The use of gelatine, as recommended by Colonel Stuart Wortley and Mr. Gough, appears from Mr. Warnerke's researches to answer admirably the whole of the requirements for a washed emulsion pyroxyline, although, according to that gentleman, the difference in effect is not so marked as in the case of an emulsion of the ordinary description. This apparent discrepancy may, perhaps, be explained by the extreme solubility of the gelatino-pyroxyline, which, according to Mr. Warnerke, is perfectly soluble in ether alone and partially soluble in hot alcohol. The presence of unevaporated solvents during the process of washing the partially-dried pellicle thus probably leads to the removal of a larger proportion of the density-giving principle than occurs in washing an ordinary emulsion film. Whether the beneficial effect be due to the formation of a true nitro-substitution compound or the so-called "glycocine," the result of the action of the sulphuric acid upon the gelatine, it is yet impossible to say. If the latter be the case, there is much probability that the experiment shadowed forth by Mr. M. Carey Lea, viz., the addition of glycocine directly to the emulsion, will be equally successful; though, as was noticed by the last-named gentleman in connection with his ferro-gelatine developer, made public some years ago, the action of the acid simultaneously upon the iron and the gelatine gave a different and superior product to that formed by the addition of glycocine to solution of protosulphate of iron. It may possibly prove that a similar rule holds good in this case.

The second formula given by Colonel Wortley for the manufacture of the gelatine pyroxyline, in which the gelatine is dissolved in the acids previous to the immersion of the cotton, appears to agree more directly with the method followed by Mr. Lea in making his collo-developer, while, at the same time, it would seem to afford a much greater chance of uniformity in the pyroxyline and to entail less trouble than the first formula. But, whether it be glycocine or nitro-gelatine which produces the effect claimed, it is evident from Mr. Warnerke's experiment with the spent acids that combination of some sort takes place between the gelatine and the cotton, the result of which is stated to be a pyroxyline of a more powdery nature, but giving less density. The first peculiarity is in all probability due to the weakened action of the acids, while the second would appear to be caused by the absence of a sufficient proportion of gelatine.

The tables given by the author to simplify the necessary calculations when employing acids of varying densities cannot fail to be of the greatest use to those who have not access to the works in which they are usually found. We also cordially agree with his remarks on the apparent anomaly of using a strong and expensive acid which requires subsequent dilution with water. It seems a much more simple, as well as a more economical, course to employ samples containing as close an approximation as possible to the actual quantity of water required, though it should be borne in mind that the higher grades of acids are nearly always the purest. Under certain circumstances such a course would be scarcely admissible, while in making such substances as nitro-glucose the very highest strength is absolutely necessary.

Of the other substances capable of being converted into pyroxyline Mr. Warnerke mentions hemp as giving a product remarkable for its intensity, and suggests, with a fair show of reason, that the result is due to the mucilage contained in the fibre. Several years ago it was stated that a very good collodion could be made from "bleached tow"—a cheap substitute for cotton-wool in surgical operations. Upon trying this substance we found it to give a strong, tough film, producing, with the bath, peculiarly vigorous images. Without doubt there are very many substances never hitherto associated with collodion which might, upon experiment, be found to offer some advantages not possessed by cotton, as it is a well-known fact that, even with different forms of cellulose, a great variety is noticeable in the products; but outside that boundary there are numerous organic substances which, under the action of nitric or nitro-sulphuric acid, give products soluble in ether and alcohol, and possessing the characteristic explosive properties of gun-cotton. Amongst these may be mentioned sugar, starch, dextrine, rice, linseed, gum arabic, gum tragacanth, and, indeed, almost any organic substance of a similar nature, though the conditions as to temperature, strength of acids, &c., are very various.

Some of these substances, although perhaps unsuitable for photographic purposes when by themselves, might be employed in conjunction with cellulose for the purpose of producing special effects in the pyroxyline, and though perhaps not capable, *per se*, of conversion under the same conditions as cellulose, it is probable, or at least possible, that the mutual reaction of the one upon the other would result in the formation of a modified product. Having run our remarks upon this important subject to such a length we must postpone, until next week, our consideration of Mr. Warnerke's researches upon the action of different bromides upon the collodion film; and, in directing our readers' attention to that gentleman's paper, we must express our high opinion not only of its manifest importance, but also of the open and lucid manner in which the author makes public the results of his experiments.

RECENTLY PATENTED INVENTIONS.

No. IV.—A CAMERA FOR FIELD WORK WITHOUT A TENT.

The invention now to be described, and for which letters patent have been granted to M. Baptiste David, of Saint Etienne, France, has for its object the providing a means for working the wet collodion process far away from the friendly shelter of a laboratory, dark room, or even a dark tent. "By means of my process," says M. David, "the operator no longer requires that appendage, so inconvenient, especially when the operation does not take place in the so-called studio. Indeed, the photographic apparatus of my invention carries with itself its *camera obscura* or laboratory, and the operator can prepare, rinse, and fix on the spot, and before the object to be reproduced, the negative, which is sheltered from all light, although he himself should be in broad daylight. Hence it follows that even under the least favourable circumstances it will be possible, by the ordinary photographic process, to take views which have not hitherto been taken for want of installation of an ordinary *camera obscura* or laboratory." As here set forth, this affords a pretty problem for the ingenious photographer to solve, and one which, as our pages testify, has engaged the attention of several members of our fraternity with a greater or less measure of success. In what direction M. David works we shall now see.

The camera or laboratory consists of a fixed box placed under the ordinary photographic camera, the capacity of this box not exceeding that of the camera. In this box is to be found another made of tin, without a cover, which can be taken out of one side of the exterior box—the side serving as a door. In this latter box are placed three gutta-percha dipping-baths, separated from each other by a partition. The first of these baths is for nitrate of silver; the second, which has two compartments, contains in one of them the iron developing solution, and in the other water; the third bath likewise is double, and contains the fixing solution in one compartment and water alone in the other.

The box or laboratory, with its various baths, is so constructed as to slide underneath the camera, the movements being effected by means of a pinion and two racks used as guiding rails, catches being provided so as to ensure the camera stopping when any of the various baths is directly below a narrow aperture in the bottom of the camera, through which the plate is lowered down to be acted upon by one or other of the solutions in the baths. The plate is moved upwards or downwards by means of nippers, between the jaws of which its upper edge is clasped, and it slides in vertical grooves in the side of the camera. The nippers terminate in a handle which rises above the top of the camera, and is of a sufficient length to admit of the plate being lowered to the bottom of any of the baths. There is a small, yellow glass pane placed in the back of the camera, a corresponding pane being in the cap of the lens, to enable the operator to examine the progress of the development after the exposed plate has been immersed in the developing bath and raised again for the purposes of examination.

The baths may be filled up from any description of vessel, but the specification includes a special means of doing so. There is a "recipient" fitted in a separate compartment beneath each bath, communicating with the same by means of an india-rubber tube provided with a tap. To fill any bath the corresponding "recipient" is lifted up above the level of the bath, into which the liquid immediately runs. The tap being then turned the "recipient" is put back into its place, ready to receive the contents of the bath upon the tap being again turned open.

The specification is illustrated by drawings, showing the apparatus in three figures. These we consider it unnecessary to reproduce, because in our estimation no further light could be imparted by them to the invention which we have here described, in some respects, with greater fulness than is found in the specification, which, being apparently drawn up by some person unacquainted with the idioms used in photography, might, if reproduced *literatim et verbatim*, be imperfectly understood by some of our readers.

The object of this invention is most praiseworthy; but it is very probable that its inventor, being a foreigner, is presumably one who has not kept himself *au courant* with the progress of the art in this country. We very often, indeed, meet with items in publications from the continent which seem to indicate that *some* of our foreign friends tacitly assume that nothing new in respect of photography can come out of the whilom "perfidious Albion." Let us see how such nescience affects the validity of the patent in question.

In October, 1852, Mr. Frederick Newton applied for, and was granted, a patent for an improved camera, in which "the sensitising, developing, washing, and fixing operations could either be performed in the camera itself or in a box attached to it, without handling the plate or introducing the hands into the camera." One of several methods specified for doing this consisted in making the bath containing the various chemical solutions "slide in grooves under the camera, so as to come successively under the plate, which is consecutively dipped down into them, the plate being for that purpose attached to a rod working in a stuffing-box at the top of the camera; or the stuffing-box may work in grooves, the troughs (baths) being fixed." As this quotation has been made from a patent "blue book" published in 1861, the patent itself having been published in 1853, we presume it is scarcely necessary we should say that *as a patent* the invention of M. David is untenable. Indeed,

it is well known to our older readers that the same invention has more than once been brought before the public by divers persons through the medium of the meetings of societies.

In aim and scope the invention is admirable. What then bars the way to its being universally adopted? In the sulphate-of-iron bath lurks the heel of Achilles; in the method of developing is to be found its vulnerable part. A system of development to be perfect, and to fulfil the requirements of photographers at the present day, must provide for the solution to be poured out upon the surface, for the effect produced being carefully and closely watched during the whole time of its action, and for the waste solution being poured away when done with. Every other operation may be performed with perfect ease and the most absolute certainty by means of the dipping-bath system described; but so long as the attempt is made to develope the image by a mode of proceeding similar to that by which the plate is sensitised and fixed, so long will this otherwise convenient method of operating in the open air be faulty in the extreme.

We invite the ingenious among our readers to look this difficulty fully in the face, and to invent a camera for outdoor work in which, without a tent or other cumbrous apparatus, wet collodion negatives may be taken with all the perfection and certainty now associated with the operations of those who are "dwellers in tents."

In a communication received about ten days since from Mr. M. Carey Lea, and which appears in another column, allusion is made to the employment of paper as a support for the negative film in place of glass—a method which attracted considerable attention last year and promises to play a by no means unimportant part in outdoor operations during the coming season. Mr. Warnerke published an exhaustive description of his method of preparing the negative tissue which is now an article of commerce, but the elaborate preparation of the paper, in order to fit it to receive the sensitive coating, was such as to deter most amateurs from attempting the operation. Our own method, which was published about the same time as Mr. Warnerke's, is much simpler in principle and answers admirably the purpose for which it is intended. Mr. Lea, after speaking of the advantages offered by the use of a washed emulsion in connection with this paper tissue, mentions another plan of a still more simple nature, and which he has found to be suitable for the same purpose. This consists in immersing ordinary plain photographic paper in a solution of india-rubber in benzole, in order to close the pores of the paper and keep the sensitive film upon the surface, while at the same time the paper does not expand and contract to the same extent under its action as it would do if an aqueous solution were employed. This method is the simplest which could be well imagined, and for *gelatine* emulsion would, we have no doubt, answer perfectly. But with a collodion emulsion the case is slightly altered, india-rubber being, as is well known, soluble in ether, and partially so in a mixture of ether and alcohol; the consequence is that the collodion coming in contact with the india-rubber partially dissolves it, or, at least, softens it, and sinks in to an appreciable depth. The effect of such softening is twofold—first, the uneven texture of the paper absorbing the india-rubber solution unequally, the latter is unequally acted upon by the collodion, hence a tendency (though Mr. Lea states otherwise) to reproduction of the texture; second, the back of the collodion film, *i.e.*, that in contact with the india-rubber, becomes, as it were, locked up—waterproofed, in fact—with the rubber, and thus the developer fails to act beyond a certain depth. Anyone doubting the truth of this has but to coat a portion of a glass plate with india-rubber and then collodionise; the difference between the coated and uncoated portions will be sufficiently marked to produce conviction. The method we described at page 290 of our last volume will be found to obviate these difficulties without materially adding to the trouble.

INVESTIGATIONS RELATIVE TO THE EMULSION COLLODION.

[A communication to the Photographic Society of Great Britain.]

Having made a promise to give some account of my experiments with gelatino-pyroxyline after Colonel Stuart Wortley's formula, I bring before the meeting the result of my observations relative to some substances used in the preparation of collodion emulsion.

The use of the collodion emulsion is now very extended; nevertheless its preparation is still uncertain, and the theories in explanation of its details apparently so contradictory, that the conclusion is not unnatural that the question of collodion emulsion is not yet exhausted, and this is my excuse for adding a few observations on the extensively-practised, but not yet quite-understood, process of emulsion photography.

I believe that, of the different formulæ for collodion emulsions, washed collodion emulsion is the one that offers the greatest advantages, and all my remarks are relative to that system.

It is a recognised fact that pyroxyline prepared at high temperatures is necessary for making collodion emulsion. It confers two important qualities—porosity of the film, and intensity by a single application of the alkaline developer, or an easy intensification by pyrogallic acid and silver; but when the emulsion possessing these precious qualities is washed, dried, and again re-emulsified the resulting thin image proves unmistakably that the high-temperature pyroxyline, though good for simple emulsion, yet requires some improvement for washed emulsion.

When, some time ago, Colonel Wortley communicated to me his plan of gelatinising pyroxyline I immediately tried it, and very soon became convinced that the addition of gelatine supplied a much-desired want.

My *modus operandi*, according to Colonel Wortley's formula, is the following:—100 grains of the finest cotton-wool are put into a porcelain jar, and thirty grains of gelatine, dissolved in the smallest amount of hot water, are added. By pressing it with a wooden stick all the cotton will be uniformly impregnated. It is subsequently very thoroughly dried before the fire.

Nitric acid, sp. gr. 1·450	4 fluid ounces,
Water	$12\frac{1}{2}$ drachms,
Sulphuric acid, sp. gr. 1·840............	6 fluid ounces,

are mixed in the order named. An arrangement is provided to keep the temperature of the mixture uniformly at 158° Fahr. The dried gelatinised cotton, weighing now about 130 grains, is immersed in the mixed acids, and left in twenty minutes. After the lapse of this time the acids are pressed out, and the pyroxyline quickly transferred to a large vessel of water. Washing and drying follow. Colonel Stuart Wortley recommended also a second mode. Gelatine, instead of being added to the cotton, is dissolved in the water figuring in the formula of the acids, and ordinary dry cotton immersed in the mixture of gelatinised acids. In my experiments I found that a considerable quantity of the acids was left from the first experiment. I added to it three fluid ounces of sulphuric acid, and immersed in this new mixture, keep-it at 158°, fifty grains more of dried cotton, supposing that some gelatine being dissolved from the first immersion, it would give me a result approaching to the second of Colonel Wortley's formulæ. The weight of the pyroxyline No. 1 was 130 grains—an increase of thirty per cent.; it was not powdery. Ordinary cotton, under similar conditions, decreases five to fifteen per cent. in weight, and is extremely powdery. The new pyroxyline dissolves perfectly in sulphuric ether (sp. gr. 0·720) alone; it partly dissolves in hot methylated alcohol (sp. gr. 0·815). In equal proportions of ether and alcohol it is soluble without any residue. A solution of ten grains of pyroxyline per ounce of solvent is quite fluid, and the film produced rather strong. The colour of the collodion in a large bottle, unlike ordinary, which is yellowish, is now a whitish opal.

The gelatinous precipitate occasioned by the addition of *aqua regia* is more difficult to redissolve than in ordinary collodion.

For comparative trials bromo-iodo-chlorised emulsions, with excess of silver, and bromised with excess of bromides, were prepared from the new and five other samples of pyroxyline. Before washing a remarkable increase of intensity and sensitiveness was obtained in the gelatinised emulsion. After washing the difference was less striking, but still sufficiently marked to prove the new pyroxyline to be a very decided improvement.

Sample No. 2, from the remaining acids, was more powdery, but gave negatives less intense.

The strength of the acids is of paramount importance in the manufacture of pyroxyline. Unfortunately they cannot be supplied of uniform specific gravity, and the hydrometer must be used for ascertaining the actual strength.

The following table, by Parkes, giving the variation of density at different temperatures for sulphuric acid, will be found of great utility:—

Parkes's Table of Variation of Density at Different Temperatures for Sulphuric Acid.

Temp. Fahr. °	Sp. gr.
42	1·8520
44	1·8522
46	1·8519
48	1·8517
52	1·8511
56	1·8500
60	1·8468
63	1·8449
68	1·8435
70	1·8430
74	1·8413
80	1·8381
84	1·8343

(I could not put my hand on a similar table for nitric acid.)

To enable the experimentalist to use acids varying in specific gravity from that given in the formula, two other tables, of Dr. Ure's, giving the amount of anhydrous sulphuric and nitric acids in hydrates of different specific gravities, will be of use in calculating amounts of such acids to suit any given formula.

Amount of Dry Acid in 100 *parts of Sulphuric Acid.*

Sp. gr.	SO_3.	Boiling-point.
1·8485	81·54	620° F.
1·8475	80·72	
1·8460	79·90	605
1·8439	79·09	590
1·8410	78·28	575
1·8376	77·46	560
1·8336	76·65	545
1·8290	75·83	
1·8233	75·02	530
1·8179	74·02	515
1·8115	73·39	

Amount of Anhydrous Nitric Acid in 100 *parts of Nitric Acid of various specific gravities.*

Sp. gr.	N_2O_5.	Sp. gr.	N_2O_5.
1·5000	79·700	1·4460	65·354
1·4940	77·303	1·4346	62·963
1·4850	74·918	1·4228	60·572
1·4760	72·527	1·4107	58·181
1·4670	70·136	1·3978	55·790
1·4570	67·745		

It is strange that nitric acid of specific gravity 1·450 is, in all the photographic formulæ, invariably recommended to be afterwards diluted with water. Nitric acid of specific gravity of 1·450 is rare, expensive, and unstable. Of all the hydrates of nitric acid, the most stable is that of specific gravity 1·42, distilling at 123° C., and having for its formula NO_5, 4HO; it is also easily obtained commercially, and at a price one-third of the former. The above-stated formula, with the aid of Ure's table, will be :—

	SO_3.	NO_5.	HO.
48 drachms sulph. acid, sp. gr. 1·840	$\frac{78\times48}{100}=37{\cdot}44$	....	$\frac{22\times48}{100}=10{\cdot}56$
32 drachms nitric acid, sp. gr. 1·450	....	$\frac{67\times32}{100}=21{\cdot}44$	$\frac{33\times32}{100}=10{\cdot}56$
12 drachms water	....	....	12·50
	37·44	21·44	33·62

Same formula with nitric acid of specific gravity 1·420 :—

	SO_3.	NO_5.	HO.
48 drachms sulph. acid, sp. gr. 1·840	$\frac{78\times48}{100}=37{\cdot}44$	....	10·56
35½ drachms nitric acid, sp. gr. 1·420	....	$\frac{60\times35{\cdot}5}{100}=21{\cdot}30$	14·28
9 drachms water	....	....	9·00
	37·44	21·30	33·84

I complete these remarks on pyroxyline by mentioning that, some time previously, I found that pyroxyline giving extraordinary density can be prepared from the raw hemp; and I suppose that the mucilage cementing the fibres, and in many respects resembling gelatine, is the acting agent, performing the very same function in the pyroxyline. Collodion from hemp-pyroxyline is red in colour, and very fluid, but the insoluble deposit is very considerable; it also requires stronger acids. It is worth remarking that the strength of acids must vary with different samples of fibres, even in the case of different cottons. I also prepared very good pyroxyline from Whatman's hand-made paper, which, being sized with gelatine, offers a ready-made material, suitable for making gelatinised pyroxyline.

On the Influence of Certain Bromides on the Collodion Emulsion.—Next to pyroxyline in the magnitude of its influence on the collodion emulsion is the choice of the halogen salts used in its preparation. Numerous experiments and long practice established the superiority of cadmium and ammonium salts for collodion bath processes; and, routine being introduced, the very same cadmium and ammonium salts, nearly without exception, are used also in the emulsion under entirely changed conditions, which, however, permit the use of such haloid salts as were banished from ordinary collodion for their instability or deleterious action on the collodion, or insolubility in the mixture of ether and alcohol. The emulsion process, however, imperiously demanded an examination of the principles reputed sound for ordinary collodion.

We have already witnessed the introduction of many new principles diametrically opposite to the old—such as, for instance, the introduction of nitro-glucose, or some similar organic compound, which Dr. van Monckhoven, at the sacrifice of ether and alcohol, washed out from the ordinary collodion; the exposure of plain collodion to light before sensitising; reversal of the relative proportions of bromides and iodides, and many others.

I took for the basis of my present researches simply bromised washed emulsion with eight grains of high-temperature pyroxyline, and seventeen grains per ounce of silver nitrate. Of these seventeen grains of silver I decided to convert—

Fourteen grains by various bromides,
One grain by *aqua regia*,

two grains being left for the organic reactions of the pyroxyline and for excess.

The following eight bromides were chosen for the first experiments:—

Bromide of potassium,
,, sodium,
,, ammonium,
,, cadmium,
,, iron,
,, zinc,
,, uranium,
Solution of bromine in alcohol (possibly containing bromal).

I shall scarcely surprise anybody when I say that the most carefully-calculated combining proportions of silver and different halogens, based on theoretical equivalents, will give most inaccurate results, because commercial samples of those salts have different practical and theoretical equivalents. In view of my present investigation I obtained nitrate of silver and the eight bromides named, and determined their combining proportions.

The following table [see opposite page] is the result of that preliminary work.

In the first instance silver nitrate in water and alcohol was introduced into the collodion; and next day different bromides and *aqua regia* followed. A marked difference was at once noticed in the appearance of every bottle of emulsion. Potassium was the most opaque, uranium very thin, but bromine the thinnest of all. On the addition of cadmium a precipitate was formed, but very soon dissolved again. Potassium, after half-an-hour, showed a granular appearance on the glass of the bottle, formed, I presume, by nitrate of potash; sodium less so. The behaviour of iron was quite exceptional: before *aqua regia* was added the emulsion, white in the first instance, blackened suddenly. I expected that nitrate of iron would reduce the bromide of silver; but I supposed that this would occur only in the presence of actinic light—experiment proved otherwise. To remedy the evil I added *aqua regia* till the emulsion whitened again; but this quantity (forty minims per five ounces) made excess of haloids instead of silver.

In this stage the emulsion was tried in the camera in the wet state; and iron, cadmium, ammonium, and sodium were most sensitive, in the order named.

	Potassium Bromide.	Sodium Bromide.	Ammon. Bromide.	Cadmium Bromide.*	Iron Bromide.	Zinc Bromide.	Uranium Bromide.	Bromine.†	*Aqua Regia.*‡
	Grain.	Grain.	Grain.	Grain.	Grain.	Grain.	Grain.	Min.	Min.
Quantities necessary for conversion of one grain of silver nitrate	0·741	0·599	0·555	0·995	0·800	0·699	1·149	2·114	1·15
Silver nitrate necessary for conversion of one grain of bromide	1·35 (1·429)	1·67 (1·65)	1·80 (1·73)	1·005 (0·885)	1·25	1·43 (1·59)	0·87 (1·21)	....	0·87§

* Cadmium bromide ordinary (not anhydrous).
† Bromine, one fluid drachm dissolved in one fluid ounce of alcohol.
‡ *Aqua regia* was made from hydrochloric acid (sp. gr. 1·18) two parts, nitric acid (sp. gr. 1·420) one part.
§ 0·87 grain of silver converts one minim of *aqua regia*.
Numbers in parenthesis ( ) are theoretical combining proportions.

When exposed to direct sunlight ammonium assumed the most intense blue tint; potassium approached the nearest in tint and intensity; sodium, cadmium, zinc, and bromine were more red; iron brown; uranium did not blacken, but some part became intensely black without being exposed to light.

After twenty-four hours' standing the emulsions were spread on glass, and, when set, washed, dried, and re-emulsified in equal proportions of alcohol and ether.

Each formed now an excellent creamy emulsion, ruby by transmitted light—iron and potassium the most opaque, bromide and uranium the thinnest.

The following is the classification according to different qualities and order:—

Sensitiveness—Zn, Cd, Na, Fe, NH_3, K, Br, U.
Intensity—Br, Zn, U, NH_3, Cd, Na, K, Fe.
Fogginess—Cd, Fe, Na, NH_3.
Blue under the action of daylight—U, NH_3, K, Na.
Red under the action of daylight—Zn, Cd.
Grey under the action of daylight—Fe, Br.
Sensitiveness to yellow light—Zn, K, NH_3, Br.
Sensitiveness to heat—Fe, Zn, U, NH_3, Na, K, Br.

The zinc emulsion for negatives left all others far behind in every respect. Potassium, though less sensitive, possessed other qualities recommending it.

The superiority of both these salts that I mostly appreciate is that they bear very long (almost unlimited) action of a strong alakaline developer, without the slightest tendency to fog, and thus permit the bringing out of details in the shadows.

Of all the series cadmium is the most apt to fog and to be ruined by incautious development. The first two, by prolonged development, acquire details and density, while others after a certain stage begin to recede; and if a slight mistake be made in exposure no forcing can remedy it, but rather hastens the ruin. This retrograde action, noticed by Mr. M. Carey Lea in his late letter, I often observed; but I think it happens more often when cadmium salts are used. Bromine emulsion, though less sensitive, possesses, nevertheless, a very valuable quality—perfect clearness of the shadow and great intensity, making it especially suitable for copying engravings. The iron and uranium experiments are not conclusive. To the first some restraining agent must be added to prevent the reduction of silver; in the second *aqua regia* is superfluous. It is apparently so restrained by the action of uranium nitrate that, even when bromide of potassium was mixed with the developer, no fog was produced. The visible action of the light passed through the yellow glass is also very remarkable. Cadmium is the least affected; zinc, potassium, ammonium, are the most so. If the developed action is also different for various coloured lights (I intended to examine this subject on a future occasion) we shall have a new principle to introduce in our investigations of actino-chemistry.

The enormous difference observed in the negatives produced by the emulsions (in all respects identical save one) forcibly point to a principle that has been overlooked in our reasoning on the photographic reactions, viz.:—

The metallic bases of the haloid salts introduced into the collodion react on the pyroxyline of collodion, form organic salts, resisting the action of washing by water, to which the half-dried collodion is subjected, and have a powerful action on the photographic property of collodion, affecting especially sensitiveness and intensity.

That pyroxyline is not inert to the action of different compounds we have a striking proof in the case of iron protochloride, which brings back the pyroxyline to the state of cotton (*Pelouse and Frémy*). We are also familiar with the fact that our negative collodion became glutinous and thick, or very fluid, according to the halogen salt used in its preparation. We now want a collodion with organic reactions for silver; but we must not overlook the fact that other organic reactions also exist, giving great variety of effects, that the determination of these effects will advance our knowledge of this important branch of photography, and that a judicious choice of reagents, based on experimental knowledge, will give new power. LEON WARNERKE.

PHOTOGRAPHIC NOTES.

I.—PAPER NEGATIVES.

FOR those who desire to get rid of glass and make their negatives on paper the washed emulsion process offers great resources. It affords the marked advantage that the prepared paper does not need to be wetted with water at any time before development, and that after collodionising it requires no further treatment previous to exposure. Everyone is aware of the difficulty of getting paper perfectly flat and smooth after it has been wetted and dried. The trouble is considerably less when the paper has only received an alcoholic treatment, because alcohol and ether do not swell the fibres to anything like the same extent.

Some experiments which I made some months back gave most promising results. They were interrupted by a journey, and I have never since had time to resume them. Finding little prospect of doing so I give the results, in order that those who are specially interested in paper negative work may use the method if they please.

My paper I prepared by passing it through a weak solution of india-rubber in benzole, in order to keep the emulsion on the surface and give it a perfect adhesion. I then coated it with the washed emulsion, such as I have described elsewhere. It remained entirely on the surface, and adhered satisfactorily. The paper proved to be exceedingly sensitive; an exposure under a negative for one second to a gas flame gave an image full of detail. In fact, as the film is in this mode of operating entirely exterior to the paper, there seems no reason that there should be any less sensitiveness than when glass is used for a support; and for the same reason the grain of the paper does not show in the image. I would recommend with those paper negatives to use the mode of development described in the next paragraph.

II.—MODIFIED DEVELOPMENT OF WASHED EMULSION PLATES.

Washed emulsions naturally differ very much, not only with the different formulæ used and different baths, but also with the different materials, as, for example, with different pyroxyline, with fused or crystallised silver nitrate, &c. As might be expected, those emulsions which give the most brilliant plates are not apt to be the most sensitive.

When a highly-sensitive emulsion shows a tendency to veil, or when it is desired to combine high sensitiveness with great brilliancy, the following modification in the development will be found extremely valuable, and much more effectual than an attempt to get the same result by merely increasing the dose of bromide. It consists simply in applying to the plate the developer as a whole at once, instead of commencing with pyrogallol.

In the early days of alkaline development it was customary to begin with alkali, and add the pyrogallol only afterwards. My own results convinced me that this was erroneous, and that it was better to begin with pyrogallol. If I am not mistaken I was the first to propose this method, now so exclusively used; and for plates made with a preservative bath separately applied, and containing still in the film the materials of the bath, that method is doubtless the best. With washed emulsion plates, made with an excess of silver nitrate, the case is somewhat different, and the modified development which I am now describing may often be used advantageously. It is to be carried through as follows:—

The quantity of water needed for the development is first to be placed in a pan, and the negative immersed in it. The pyrogallol, bromide, and ammonium carbonate are to be mixed, the plate taken out, the developer added to the water, well mixed, and the plate to be returned. The different ingredients of the developer may be measured in succession into the same minim glass, one over the other, if they follow in this order—pyrogallol, bromide, and carbonate. I recommend to use twenty minims each of a sixty-grain pyrogallol, thirty grains of bromide, and eighty grains of ammonium carbonate to four ounces of water.

In using this modification the proportion of bromide may be somewhat, but not much, diminished; and I have also noticed that plates so treated will bear a larger dose of carbonate (if forcing be needed) without injury than in the case of the ordinary development begun with pyrogallol alone.

There is one peculiarity in this development—the image always delays a little in coming out. A pause of half-a-minute or three-quarters takes place after the developer is applied before anything appears; *and this takes place even in the case of an over-exposed plate.* I have tried over-exposing a plate by six or eight times its proper exposure. The high lights did not show themselves for a full half-minute; but this did not prevent them reaching any amount of density with a weak developer. It is necessary to bear this distinction clearly in mind, and to remember that the same image that would come flashing up under the ordinary treatment in this case comes out slowly and regularly, and the delicate detail will come up just as it does with the ordinary method.

It is probable that one reason that such different results are obtained by different persons in working upon any given formula lies in the different quantities of *chlorides* contained in the water used for alkaline development. It is evident that water containing a considerable quantity of alkaline chloride must act as a powerful restrainer, and that in developing with such water less bromide will be needed.

But it should also be borne in mind that any restrainer acts much more powerfully if it be applied previous to the active agent in the development. An exposed plate plunged into water containing chlorides cannot but be more powerfully affected by them than if the same amount of chlorides were added together with or after the ammonia. The water which I myself use contains a faint trace only. If I were compelled to use water containing any considerable quantity I should endeavour to avoid commencing by wetting the plate, and should apply the whole developer at once to the dry plate. The difficulty to the way of operating so lies in the need of sweeping the developer regularly over the whole plate without pause, lest there should be lines of unequal development.

III.—Mr. H. J. Newton's Process.

It occurred to me, last winter, to try a process in which silver nitrate should be added to a collodion in quantity such as to bring it to a moderate excess, and, later, to add chloride in such quantity as to entirely decompose the silver nitrate and leave a moderate excess of soluble haloid. I was in hopes thereby to obtain an emulsion with a fair degree of sensitiveness and good keeping qualities. The process turned out to be only moderately good. Such as it was I published it, without any particular recommendation, in The British Journal of Photography for March 12, 1875, at the end of an article devoted to a much more important process. It will be found in the second column of page 123.

Subsequently Mr. Newton, who had possibly overlooked this communication, published the same process (omitting the use of silver iodide) without any acknowledgment of priority. I have never hitherto cared to make any reclamation, and should probably not do so now had I not noticed in an article written by Mr. Newton a comparison between the process in question and that which I particularly recommend unfavourable to the latter. I believe it is said that the last-mentioned requires a double exposure, or something of the sort. I need scarcely say that this must be an entire mistake. Comparisons of this kind are much better avoided, except where they are made with commercial preparations within the reach of everyone and of uniform sensitiveness.

In the present case the matter stands just thus:—Last winter I carefully tried a process of my own devising, and finding it moderately good, but much inferior to others also originating with myself, I published it briefly as a practicable method, giving, at the same time, a much better process, which I afterwards further improved upon. Mr. Newton has since published a process corresponding in all its essential features with that which I had imagined, experimented with, and published, but without commendation, because its sensitiveness, though very fair, was not the highest, and its keeping qualities were not altogether satisfactory. From this Mr. Newton's process differed only in that he omitted the iodide, which omission was certainly not an improvement. In describing my process in your columns the paragraph is headed "Chloriodo-bromide Process with Excess of Alkaline Bromide." This last word should, perhaps, have been chloride, inasmuch as it is the chloride which is expressly directed to be added last, and which turns the scale, decomposing the last portions of the silver nitrate, leaving the haloid in excess. It is, however, by no means certain, when silver nitrate is placed in such a position, whether the soluble haloid left undecomposed is a chloride or a bromide, no matter which may have been first added. But this is, in the present case, practically a matter of no importance. The course directed to be taken on page 123 of your last volume is precisely that of Mr. Newton's subsequent publication —addition of silver in excess, and, subsequently, enough of a soluble chloride to remove the excess of silver and leave excess of soluble chloride.

Referring to my note-books for details which I did not publish because the process was not of sufficient importance, I find that I left the excess of silver nitrate in contact with the emulsion for six hours. At the end of this time I added the chloride, using cupric chloride. It was only later that I introduced the use of cobalt chloride into emulsions; it is cobalt chloride that Mr. Newton adopted (this would of itself indicate the relative dates). Experiment and careful comparison showed beyond the possibility of a doubt that the process with excess of silver nitrate contained in the emulsion up to the time of applying the sensitising substances called "preservatives" gave a markedly higher degree of sensitiveness. Under these circumstances I can scarcely consent to see my older and less useful process revived as new with a claim for a higher degree of sensitiveness than possessed by the better and more sensitive process for which I rejected it.

I do not for a moment suppose that Mr. Newton, whose communications I often read with interest, intended to take without an acknowledgment a process originating with another. It was, doubtless, a case of the same idea occurring to two different persons; but as to the order of date there can be no question.

But all those processes depending upon the use of an emulsion, followed by a bath applied to each separate plate, must in the end disappear and give place to washed emulsions. No one who gives a fair trial to the latter, and obtains at once the highest degree of sensitiveness, indefinite keeping qualities in the emulsion, and the minimum of trouble in manufacturing, will consent to go back to the processes in which each plate needs to be treated separately.

M. Carey Lea.

NOTES FROM THE NORTH.

In my *Notes* of last month I noticed the opening of a new studio, on a rather ambitious scale, by Mr. Ayton, and to show still more forcibly that the dulness in photography as a business at present generally admitted is by some at least regarded as only temporary, I have this month the pleasure of recording the opening, by Mr. Tunny, of an establishment which, in size, convenience, and elegance eclipses anything of the kind ever attempted in Edinburgh at least.

It is pretty well-known that in point of time Mr. Tunny is one of the oldest, if not *the* oldest professional photographer in Scotland, and therefore, in consequence of the large experience which he has thereby gained, the erection of a new studio with all the usual working appliances, in a situation where he could carry out his own ideas without let or hindrance, has been watched with considerable interest. In addition to his long experience as a practical photographer, Mr. Tunny recently spent six months in the United States, where he visited most of the principal studios there, so that the establishment just completed may be regarded as the outcome both of much experience and extensive observation.

In the early days of photography Mr. Tunny carried on successfully for many years a business in the southern suburbs of Edinburgh. As photography became popular, and competition increased, he considered it desirable to migrate to the centre, and fitted up an extensive establishment in Princes-street, which was also carried on with considerble success. Some years ago, in consequence of a desire for the purer air and greater quiet of a suburban residence, together with additional space for the execution of larger work, he returned to the southern side, where he erected an extensive and convenient studio, and a series of very complete work-rooms. These were a few years ago burnt down, but only to be re-erected on a more extensive and perfect scale. During this time the studio in Princes-street was carried on as a branch establishment, but, in con-

sequence of the property having been acquired by an insurance office, he found it necessary to look out for another position, and under the impression that, as is generally the case, the money-possessing and money-spending portion of the inhabitants were moving in a westerly direction, he decided to follow them in the hope of coming in for a fair share of their surplus wealth. With this object in view, shortly after his return from America Mr. Tunny purchased a large house in Shandwick-place, and, having razed it to the ground, commenced the present edifice which has been so successfully completed.

The building is four stories in height, and projects a few feet further into the street than those to the east and west of it. Externally it has an imposing effect, the architecture being in the Italian style, the front consisting principally of glass, and so arranged that fine views of the street, both east and west, are obtained from the principal windows.

The basement is principally used for storage purposes, with the exception of the centre portion, in which is situated the furnace and boiler of the heating apparatus, which is on Perkins's principle, and tubes from which are carried through every part of the building, keeping up an easily-regulated temperature from floor to ceiling.

Entering from the street by an ornamental glass door the visitor finds himself in a handsomely-decorated lobby measuring 25 × 12 feet, the walls of which are hung with fine specimens of enlargements in various styles of finishing, including large numbers of excellent examples of painting in oil. Access to the first floor is obtained by a highly-decorated larch-pine stair-case, which leads directly through a wide archway into an elegantly-furnished room 30×15 feet in extent. This is intended to be exclusively used for the exhibition of photographs in oil, and is well adapted for the purpose, being lighted both from the ceiling and by two glass doors leading into the gallery, or reception-room proper. A door at the opposite end of the room leads into an apartment measuring 24 × 15 feet, fitted with numerous desks for retouching and spotting purposes. Here, too, is a table for cutting and mounting, and also rolling-presses and burnishers. A door from this admits into a small but luxuriously-furnished painting-room, lighted from two sides and from the roof, but so fitted with shutters that the artist has the light completely under control. A second door in the finishing-room leads into the printing department—a spacious room of 30 × 20 feet, furnished with every convenience for comfort and despatch. Along one side, and running the whole length of the room, is a table projecting some four feet into the open air, on which the printing-frames are laid. This printing-table is covered with a series of sashes glazed with ground glass and placed at an angle so that the work may be carried on during rain as well as in sunshine, and, as these sashes are hinged at their upper ends and balanced with weights, all or any number of them may be raised and the printing carried on in the open air. The centre of the room is occupied by a long table with a yellow glazed screen on the side next to the light; so that the frames may be filled, or the prints examined, without fear of injury by exposure to white light. The arrangements for sensitising and fuming are also very perfect, the necessary apparatus being contained in a kind of cupboard or press, and so arranged that, by turning on a stream of heated air, twenty or thirty sheets may be dried in a few minutes, and then, in the same way, a current of air charged with ammonia is applied. The wall opposite to the printing-table is occupied with a range of what appear to be bookcases, but which are in reality cases for the storing of negatives. The shelves are closely grooved, and contain many thousands of all sizes, any one of which, by a very perfect system of registration, can be readily found when required. A door at the end conducts into the fixing, toning, and washing room, which, like every other department, is very perfect, including a depositing sink in which, by the simplest means, most of the silver used is recovered. The prints are kept moving for an hour in an automatic washer, and then separately subjected to rolling pressure between a plate of glass and a rubber roller under a stream of water, and Mr. Tunny is satisfied that in this way he secures the most perfect removal of hypo. in the shortest possible time.

Returning to the first reception-room, or gallery of paintings—from which, I may say, there are several doors leading into dressing-rooms—the visitor enters by either of two highly-ornamented glass doors into what is called the gallery. This apartment is magnificently furnished, is in extent 28 × 22 feet, ornamented in the highest style of art, and contains large quantities of the very best specimens of Mr. Tunny's work in monochrome. The couches and chairs, like those in all the other apartments, are covered with crimson Utrecht velvet, and everything, including a set of fine Indian curtains, is in perfect keeping, constituting a luxurious *ensemble*. In fact, so thoroughly has Mr. Tunny resolved to study the tastes of his *clièntele* that he has fitted up an organ from which sweet music may be "discoursed," and thus may be preserved the equanimity of those who, while waiting to be photographed, might otherwise become wearied with the art-treasures so abundantly scattered around.

From the gallery the visitor ascends by an easy flight of stairs to the studio—the centre of real interest to the photographic section of my readers. This is an imposing apartment, measuring 28 × 21 feet, and eighteen feet in height. The walls are painted a neutral tint, and broken up into panels by various shades of the same colour. The opaque portion of the ceiling is richly moulded, and advantage has been taken of the mouldings to provide for perfect ventilation, the vitiated air being drawn up by an external screw arrangement. The roof from end to end, and for about two-thirds of its breadth, is opaque, and then there is glass eleven feet in breadth and running to within three feet of either end, which comes down at an angle of 45° to twelve feet. The side light runs the same length as the top light, is six feet high, and begins three feet from the floor, so that the top light forms a pretty acute angle. One peculiarity- and the only one about which I have some doubt—is that the whole is ground glass. This, undoubtedly, entails a large loss of light; but probably for this compensation may be found in the large quantity of glass in use. Mr. Tunny assures me that his experience of ground glass in his studio at the south side warrants him in believing that it is the right thing. The top light is fitted with white blinds on spring rollers; but Mr. Tunny is under the impression that he can do without blinds altogether, and be able to get any desired effect in lighting by placing the model at varying distances from the glass and in varying relations to the angle of the top light. This is, I say, a matter about which I am not quite clear; but I shall watch the experiment with no little interest, and inform my readers of the result on a future occasion.

Access to the dark room is obtained by a door leading from the studio as well as by one in the lobby. It measures 14 × 14 feet, and is fitted with every convenience suggested by experience. In no sense of the word, except actinically, can the room be called "dark," as it is lighted by a large window immediately opposite the developing-trough; and the yellow, or rather orange, glass by which it is covered—and which, in wooden frames, is made to slide past each other easily, for the admission of any amount of white light when it is required—admits sufficient light to enable a person to read small print in any part of the room. A door out of this leads into another room of the same size, kept entirely for enlarging purposes, and fitted up with the most convenient and perfect apparatus.

On the whole, Mr. Tunny's west-end establishment is the most complete that I have seen either here or elsewhere, and I venture to hope that the bold stroke he has played may ensure a fair share of commercial success.

The exhibitions of the Royal Scottish Academy, Edinburgh, and of the Fine-Art Association, Glasgow, have been opened almost simultaneously, and, although there is nothing very striking in either, both are above the average in general merit. A careful examination of either or both will make one thing quite clear, namely, that, whatever artists may say to the contrary, photography has exercised a large influence on art—an influence, I am sorry to say, not always for good. In too many cases it is painfully evident that boldness and breadth are giving place to minuteness and sparkle of detail—much to the satisfaction of a class of certain would-be connoisseurs, but to the regret of all the lovers of true art, and to the annoyance even of some of the artists who are sinners in this direction. In discussing with one such artist the merits of his own pictures he frankly admitted the falling away, but assured me that, however highly he loved art, his duty to his family made it necessary to paint pictures that would sell; for his experience in the art market showed very clearly that the nearer he could approach to photographic detail the more readily did a discriminating public become purchasers of his works.

I trust that, while the exhibitions are open, photographers will not be slow to avail themselves of the advantages they offer to both portrait and landscape workers. Both exhibitions contain some fine portraits, a careful study of which, both in pose and lighting, cannot fail to increase the power of the student in producing good work; and there are many landscapes which, as examples of composition, would greatly improve the artistic efforts of the approaching season if all would endeavour to have the leading features of these pictorial works firmly impressed on their minds.

Everybody was, doubtless, glad to learn from a paragraph in last week's issue of the Journal that Glasgow is again bestirring herself

to start a photographic society. So far as I can learn the two former societies came to grief in consequence of a supposed antagonism between professional and amateur photographers, whereas I believe genuine success can best be obtained by a judicious fusion of the two elements. The members of a photographic society should have only two objects before them—the promotion of friendly intercourse and the advancement of the art. The amateur and professional photographer may each learn much from the other. Let them lay aside their differences with their great coats and both pull at one end of the rope, and success will be achieved.

From a notice in the Journal it will be seen that the Edinburgh Photographic Society has resolved to hold an exhibition of photographs in December; and from a knowledge of those who have taken the more important part of the work in hand I believe that everything that is possible will be done to make it a great success. May I venture to hope that photographers throughout the world will keep it in mind, and furnish such an abundance of really high-class work as has never before been seen north of the Tweed?

I have long thought much benefit would be derived, both by the public and the profession, if some of the large army of popular lecturers would add photography to their other branches of general knowledge. In consequence of the ignorance of a large section of the public of the general principles of photography, and especially of the conditions as to colour, &c., under which the highest degree of success can be obtained, the professional portraitest is often put to much inconvenience, and only succeeds well after overcoming difficulties that more general knowledge on the part of his sitters would have altogether prevented. No doubt, we occasionally hear of a popular lecture on photography, but they are few and far between; and it is curious that it should be so, as there is hardly a single subject that would afford a greater number of strikingly-beautiful experimental illustrations. It is pleasing to record a move in the right direction by Mr. Ross, of the firm of Messrs. Ross and Pringle, who, a few days ago, entertained and instructed a large audience with such a lecture as I have indicated. He treated of photography under three heads—optical, chemical, and artistic—and illustrated each by some attractive experiments, being particularly successful in photographing a bust by the magnesium light, and in illustrating the artistic phase by a series of well-chosen transparencies. The lecture concluded with the general statement that posture was most perfectly expressed by Greek sculpture, and that in modern statuary there was a decided tendency to the stiffness of the Egyptian style—a style almost universally adopted by the less artistically-educated class of photographers. JOHN NICOL, PH.D.

INSENSIBILITY IN CARBON TISSUE.

THE various little niceties necessary to be observed in order to obtain the best results the method of printing with silver yields are so well known that it would be almost a waste of space to recapitulate them. At the present time what may be with some truth termed a new printing process is engaging a great deal of attention—I refer to carbon printing. Its novelty will bring along with it those difficulties always experienced when leaving a beaten track, and it will be some time before all the conditions essential to success are as familiar to photographers as those of the method now in general use. It is my intention to point out a cause of failure, which, I believe, has not hitherto been recognised, or, if so, no rational explanation has yet been given of the source of error.

Words are said to be written over the portals of a certain unmentionable place to the effect that all they who enter there leave hope behind. The entrance to that doubtful state of blessedness termed celebrity in the photographic world has something of a similar nature inscribed over its gates, in reference to the hope all men have to avoid incurring the abuse of their fellows, and to be applied particularly to the celebrity achieved by helping the lame dog over the style; for, so sure as you do it, he will bite. So much for digression.

Some time since a gentleman placed a piece of tissue in my hands, which he affirmed was very insensitive as compared with another, in the proportion of seven to one. So excessive an amount of dissimilarity I did not find; but, as I had not both samples, I cannot say anything about the correctness of the figures. Such a condition of things must be very unsatisfactory; for, if various tissues cannot be made practically of equal sensibility, any system having for its object the classification of negatives, and numbering them with tints necessary to give a good print, will have its usefulness seriously interfered with. Such considerations as these led me to institute a series of experiments to determine whether variety in sensibility did exist. The means adopted for the test precluded any possibiliy of error.

The different tissues (ten in number) were first placed under such conditions as to ensure an equal state of dryness; second, immersed and withdrawn simultaneously from the sensitising bath, then dried at an equal temperature, exposed under conditions that ensured equality of lighting, and developed together. The result showed considerable variation in degree of sensibility. But the experiments did not end here; an amount of useful information was obtained that may with profit be discussed at some future time. It chiefly refers to the physical properties, and, in one instance, a careful determination of the composition of a colouring matter. However, my present object is simply to deal with difference in sensibility, and for this purpose, and to prevent complications, it will be as well to treat of the extreme cases—the most sensitive and insensitive variety.

An aid to clear understanding will be gained if it be first stated what was the measure of sensibility. In the case under discussion the obvious and, from a practical point of view, correct standard would be the intensity of tone produced by a definite exposure to a definite light, or, what amounts to the same thing, a simultaneous exposure of the varieties under observation to a light of varying intensity for equal time. Such a standard must be theoretically liable to error, inasmuch as unequal amounts of colouring matter in the tissue would result in corresponding inequality of tone irrespective of the action of light. This I must assume, viz., that the colouring matter is equal; and that this assumption is not irrational is obvious when we reflect that it is more likely than otherwise that the colouring matter is so adjusted as to produce tones of equal intensity in the same gelatine with equal exposures, and that notwithstanding variety of pigment.

Another point for consideration—and, although its bearing may not at first be recognised, it is here, I think, where the varying sensibility noticed arises—is that a tissue sensitised in a weak bichromate bath is not so sensitive as if sensitised in a strong one. If this be granted (and it is demonstrable) little difficulty will be experienced in showing that it is sufficient to account for at least one of the vagaries hitherto attributed to errors in manufacture of tissue.

Whatever may be the cause, it is difficult—if, indeed, not impossible—to obtain two samples of gelatine having precisely the same qualities. The temperature at which solution takes place is not constant. Again: the amount of water it absorbs in the cold in different samples has a wide range. Many other variations might be mentioned, but it is to the latter I desire particularly to draw attention.

If tissues alike in every respect, except in that of absorption, were sensitised in the same bath and for the same length of time it is clear the most absorbent would be the most sensitive. Suppose one took up one hundred parts and another one hundred and fifty of the sensitising solution, exactly the same disproportion would exist in the quantity of bichromate in the dried tissue, and such conditions would thus be brought about as if tissues alike in every respect were sensitised in solutions of unequal strengths.

Of the two tissues above mentioned experiment showed that absorption alone, owing to the difference in degree thereof, would bring about a condition of things such as would exist between tissue sensitised on a 5 per cent. and 4·24 per cent. bath.

The remedy for such is twofold—one in the power of the manufacturer, and the other in the hands of the photographer. The first could adjust, after careful testing, the quantity of pigment to the quality of gelatine; the second might increase the strength of solution (bichromate) when he finds insensitiveness arising from the cause here indicated, as he is then merely bringing about such conditions as correct the difference in gelatine. Whatever course be taken concerns me but little; sufficient it is to have pointed out a source of error and the way to avoid it. W. E. BATHO.

FOREIGN NOTES AND NEWS.

THE PARISIAN CARBON WAR.—THE AMERICAN PHOTOGRAPHIC TRIMMER.—THE PRIZES OFFERED BY THE PHOTOGRAPHIC SOCIETY OF VIENNA.—THE PHOTOGRAPHIC SOCIETY AT FRANKFORT-ON-THE-MAINE.—LARGE LENSES.—"SPIRIT" PHOTOGRAPHS.—A DELICATE TEST FOR THE PRESENCE OF HYPOSULPHITE OF SODA IN WATER.

THE action which has so long been pending between Mr. J. R. Johnson and M. Liebert respecting the validity of certain patents in connection with carbon printing seems to have come to a standstill

at present, having been referred to the opinion of experts in the matter. There are rumours that a coalescence between the parties is on the *tapis*, with the object of combining their interests. Whether this will have any advantageous effect upon the interests of carbon printing remains an open question; some of the Parisians appear to think it will not.

Herr Nöhring, who has been so successful in photographing the old paintings in the Pinakothek, at Munich, has obtained permission to copy those in the museum of the same town.

The Photographische Correspondenz recommends a very simple little contrivance for keeping the American portrait trimmer sharp. Cut a groove in a sheet of lead and fill it with emery powder and olive oil, and the trimmer may be well and easily ground by drawing the wheel frequently along the groove.

The programme of the prizes offered for competition by the Vienna Photographic Society has just come to hand. It is divided into two parts. The first half contains a list of the prizes offered from the Voigtländer fund; and the latter those offered by the Society itself. Not having seen a copy of the rules of the Voigtländer fund we are unable to say if the competition for the first series of prizes be strictly confined to members of the Society or not, but we believe it is so; while, from the circumstance of the Society having resolved to publish its programme in French, we infer that they invite the competition of non-members for their own prizes. The prizes offered by the Society itself are seven in number, and an outline of the subjects for which they are offered was given a fortnight ago. The regulations as to the names of competitors are the same as those for the prizes offered by the Industrial Society of Rouen already mentioned, and the only envelopes to be opened are those of the successful competitors. The competing works will be received by Dr. Hornig up to the 31st October; the awards will be made in December. When the subject of competition is a new process the Society reserves the right of publishing the process to which the premium is awarded, or, in the case of pictures, it reserves the right of reproduction in its organ, the *Photographische Correspondenz*. When a medal worth 140 ducats is offered, the prize-taker is allowed the option of taking his reward either in that form or as a medal worth forty ducats and 100 ducats in money. The Society also reserves the right of awarding smaller prizes to meritorious works which do not fulfil all the conditions required by the programme:—1. A gold medal, or a medal and 100 ducats for a process for producing plates, either in relief or sunk, in half-tones, by means of photography. Competing works must consist of *at least* two plates of the dimensions of 8×10 inches (21×26 centimetres) together with three prints from each and the original matrices. One plate must be a portrait and the other a landscape, both reproductions of originals to be taken from nature. These must be accompanied by a description of the process so minute in all its details as to be easily understood by every professional.—2. A gold medal for a critical study of the reactions of chromic acid and its salts upon albuminate, albuminoid, carbonic hydrate, and resin, with special reference to the various heliographic printing processes. The competing works to be accompanied, whenever it is possible, by vouchers for the practical application of the results of the scientific researches.—3. A silver medal for *genre* pictures. There must be at least two 8×10 plates, accompanied by three impressions.—4. A silver medal for twelve carbon pictures produced in Austria or Hungary.—5. A silver medal for a collection of, at least, twelve views of ancient monuments (accompanied by a minute description). In the case of monuments in localities very difficult of access pictures less than 8×10 will be accepted, but none less than cabinet size will be admitted. Regulations as to copies, &c., similar to those already given for the former subjects.—6. A silver medal for a collection of, at least, twelve ethnographic studies. The conditions as to size, &c., are the same as for the preceding, and the pictures must be unpublished.—7. A silver medal for a collection of anthropological studies. Regulations as for preceding.

The photographic society lately "planted" at Frankfort-on-the-Maine seems to have taken kindly to the soil, and to be in a very thriving state. Since we mentioned its formation there have been several meetings, at one of which a subject touched upon in last week's number of THE BRITISH JOURNAL OF PHOTOGRAPHY was discussed, namely, whether with the increase of the size of the objective a correspondingly large and sharp picture might be expected. The conclusion arrived at was also similar—that when the aperture is over five inches the expense and unwieldiness of the lens and accompanying camera are not repaid by a proportionate increase in the size and sharpness of the picture obtained; and that it is more practicable to obtain extra-sized pictures by enlarging with a solar camera.

At the following meeting the principal subject of discussion was Dr. Stein's account of his encounter with the spiritualists and spirit-photographers at Brussels, on which occasion he showed that he also could photograph "ghosts," and explained his *modus operandi* without being able to shake the faith of the believers. In the dark room he exposed a plate by artificial light for a very short time, and thereby got a latent image of a picture which he took there on purpose. Afterwards the plate was exposed in the camera in the usual way and a fully-exposed portrait of the sitter was obtained, beside which, when fully developed, appeared the faint image got by the pre-lighting. After the negative had been examined Dr. Stein drew from his pocket the picture from which the "ghost" was photographed, but failed to convince his auditors of the non-mysteriousness of the process.

At a subsequent meeting M. Liebert's circular was discussed, after which Dr. Stein showed a photograph mounted in 1869, one half of which was made to adhere to the cardboard with gum arabic and the other half with paste. One half of it had become yellow, while the other retained its original freshness.

At the last meeting Dr. Schleussner spoke of a test for the presence of hyposulphite of soda in water used for washing photographs. The test rests upon the use of starch and iodine, and the speaker illustrated his remarks by a number of practical experiments, in the course of which the presence of the hypo. was detected by means of the starch and iodine in solutions of various strengths up to 1 in 120,000. The reaction is based upon the discolouration of the blue starch and iodine, which is produced by even the weakest solution of the hypo., and from the number of drops of iodic-starch solution from which the colour is removed a sort of idea can be gained of the quantity of hyposulphite of soda contained in the liquid experimented upon. The other subjects discussed were the removal of silver stains from varnished collodion films and a lecture by Dr. Stein upon microphotography and photomicrography, with practical illustrations of both processes.

Meetings of Societies.

EDINBURGH PHOTOGRAPHIC SOCIETY.

THE second "popular meeting" of the season was held at Queen-street Hall, on the evening of Wednesday, the 2nd inst. The hall was crowded in every part.

The exhibition consisted of a series of views of Paris, before and after the siege, and was accompanied by a humorous lecture by Bailie Marshall.

Dr. JOHN NICOL, the lecturer to the Society, in introducing the Bailie, said that, although his own name appeared on the admission cards, he was very glad that he had found a substitute much better able to do justice to the subject. The fact was (he said) that with such subjects as Java, Japan, and Demerara, lecturing was comparatively a simple matter, as the audience was not supposed to know very much about those countries, and he could, consequently, say pretty much what he liked; but in the case of Paris, about which he knew very little, while some of his hearers knew very much, he felt that he would be treading on unsafe ground, and so had been glad to get Bailie Marshall to undertake the duty.

The lecturer commenced by giving a vivid description of Paris as it was, and a very humorous account of the visit of the Edinburgh municipal authorities to that city on the opening of the Great Exhibition. The lecture was interspersed with many amusing anecdotes, and was greatly enjoyed. The pictures, which had been kindly lent by Lieutenant Gilbert, were of fine quality, and elicited much admiration.

At the conclusion of the lecture, on the motion of Dr. Thompson (the President), votes of thanks were awarded to Bailie Marshall and Lieutenant Gilbert.

WEST RIDING OF YORKSHIRE PHOTOGRAPHIC SOCIETY.

THE ordinary monthly meeting of the above Society was held at the Victoria Hotel, Bradford, on the evening of Monday, the 10th ult.,—Mr. J. Smith, Vice-President, in the chair.

After the minutes of the preceding meeting had been confirmed the Society proceeded to the election of a President in the room of Mr. J. W. Gough, resigned, which resulted in the promotion of Mr. John Smith, the Vice-President, to the presidential chair. Messrs. Wolstenholme and Jennings were then elected members of the Society.

The SECRETARY read a communication, and laid on the table a diagram, from Mr. D. Winstanley, F.R.A.S., on *Darkness and Disease*, as follows:—"It has long been suspected, and even confidently asserted, that there is an intimate connection between darkness and disease, and, indeed, many evidences have been adduced which amply justify the allegations. So far as I am aware, however, no direct experimental evidence has been advanced which indicates the closeness of this relationship, and for the very saticfactory reason that, until within the past few months, no instrumental means have been employed by which the aggregate quality of the light of day could be satisfactorily arrived at and accurately expressed. These means, as you are aware, I have fortunately had the honour to devise, and I have already submitted to your Sercretary diagams showing the daily variations in the quantity of light radiated from the southern sky. I have recently made a comparison of my figures with those of the Manchester Officer of Health, and the result is that I have obtained a confirmation of the alleged relationship between darkness and disease, in so far, at any rate, as concerns disorders of the lungs. You will see on reference to the diagram that the number of new cases of lung disease varies—not exactly, but substantially—with the variations of the light, being greatest when the amount of light is least, and *vice versâ*; that is to say, the line graphically representing the variations of disease is in effect parallel with that representing the variations of the light. Were the two lines absolutely parallel the inference would be that lung diseases were produced by variations in the light and by these alone, or that the variations in each were directly dependent on one and a common cause. This it could not be expected would prove to be the case, as variations in temperature and in rainfall must both tell on the numbers of diseases of the lungs. My diagram, I think, will satisfy you that whatever may be the immediate and total causes of lung disease they are very intimately connected with the variations of the light. I have good grounds for the opinion that mental maladies and derangements of the nervous system vary in their intensity with the variations of the light, and I trust shortly to be able to submit figures by which this will be conclusively made out." [Mr. Winstanley illustrated his short paper by a diagram.]

Mr. W. E. BATHO remarked that, as light travelled through a medium of varying densities, its power would vary according to the density of the atmosphere at the time of observation. He had himself, some two years ago, constructed a piece of apparatus for making actinic observations, and the light danced about like the mercury in a barometer. He thought it would possibly be demonstrated that the light varied with the rise and fall of barometric pressure.

A vote of thanks was accorded to Mr. Winstanley for his interesting communication.

Mr. J. Howarth handed round for the inspection of the members a copy of *Tissandier's History of Photography*, the frontispiece, a phototint by Messrs. B. J. Edwards and Co., being much admired.

Mr. Batho exhibited a small contrivance for securing mechanical registration in carbon printing, and promised to show, at an early meeting, a new actinometer.

After some further conversation the meeting was adjourned.

ANOTHER ordinary meeting was held at the same place on the evening of Monday, the 7th inst.,—Mr. J. Smith, President, occupying the chair. The previous minutes having been confirmed, Mr. W. Cooke, Keighley, was elected Vice-President of the Society. Mr. Crabtree was elected a member.

Mr. Batho exhibited some experimental strips of carbon tissue and silver paper which had been exposed to light in his new actinometer, the gradations of which were singularly fine and much admired, and he promised to exhibit the instrument at the next meeting.

Mr. Sachs also said he would exhibit some specimens of M. Leon Vidal's photochromes, and Mr. Batho undertook to describe the process by which they were produced.

The meeting then became of a social and conversational character until its adjournment.

GLASGOW PHOTOGRAPHIC ASSOCIATION.

THIS Association, having fallen asleep for some years, has thought proper to wake up again and shake off its somnolency. It has had three meetings, at which the propriety of its reorganisation has been duly ventilated. At its last meeting, which took place on Wednesday evening, the 16th inst., at the Religious Institution Rooms, Buchanan-street, it added a goodly number of members to its roll.

After the business portion of the proceedings was disposed of, the attention of the meeting was called to the examination of a fine variety of specimens of "Dallastype," submitted by Mr. Mactear, which gave evident pleasure, and were pronounced excellent; but, as they were all *line* work specimens, the members present deferred saying more till they saw specimens of the "Dallistint," which Mr. Mactear said he expected to exhibit at the next meeting.

Mr. BOWMAN then drew attention to a number of so-called spirit photographs, direct spirit pencil drawings, and paintings in oil. The photographs he could not vouch for, but he believed them to be genuine. The spirit drawings and paintings, however, he declared there could be no mistake about, as the phenomena had occurred in his presence and under such conditions that anything like deception was out of the question. The photographs were not such as to cause admiration, but the drawings and paintings were something wonderful if produced as he (Mr. Bowman) asserted they were.

A great many of the members declined to endorse Mr. Bowman's statements.

A very animated conversation was entered into regarding the price of tissue charged by the Autotype Company. The members, generally, considered the price so high as to materially interfere with the desire of photographers to substitute carbon for silver prints, and they hoped the Company would see their way to a reduction in price, so as to encourage their giving it a fair trial and thereby open up a large trade.

The meeting was then adjourned.

BERLIN PHOTOGRAPHIC SOCIETY.

AT a recent meeting of this Society Herr E. Sommer showed a collection of the much-talked-of Aubeldrucks, the method of producing which has now been kept secret for upwards of a year, and, though all through that year our curiosity on the subject has been kept at boiling point by the numerous hints and allusions dropped from time to time, it seems that the laudable endeavours of our inquiring minds to solve the mystery are not yet to be crowned with success, but that we are to be left on the tenter-hooks of expectation for some time longer. Meantime, another mysterious process has cropped up, and the learned in such matters may turn their attention to a new nut which has, as yet, baffled all Dr. Vogel's nut-cracking powers. He says that when visiting the State Printing Establishment at Berlin he saw a photo-mechanical printing process which he can neither explain himself nor has he yet been able to get an account of it in any scientific book. A plate which, to all appearance, differed in no way from an ordinary unvarnished negative, was taken and treated, before his eyes, like a lithographic plate; that is, it was damped with a sponge and rolled with colour, so that the ink was taken on by the transparent places, but not by those standing in relief. From this plate an impression was taken by a lithographic press, the precision and delicacy of which was unapproached by any equally-simple photo-mechanical process. M. Placet, of Paris, has for some ten years back obtained films for printing purposes by coating ordinary negatives with chromic size and then lighting them and treating them with warm water—a treatment common to most of these processes; but in the plates at the State Printing Establishment Dr. Vogel observed nothing to lead him to think that they had been treated with chromium. The prints pulled from the negatives are not used directly, but for the transference of the picture to stone, from which it is printed in the usual manner. Dr. Vogel also spoke of another interesting heliographic process, similar in principle to one described by Scamoni in his instruction-book on heliography, by which very good results are obtainable. A positive is obtained in the camera from an ordinary negative. The positive is then intensified until it stands out in such high relief that a printable copperplate can be obtained galvanoplastically from it. Dr. Vogel is, however, quite satisfied that the details of the process in use at the State Printing Establishment should not be published, as it prevents the falsification of any of the valuable documents printed there.

Herr Scholz showed a number of photographs, architectural subjects and landscapes, and Herr Schoene sent a number of Californian landscapes.

A member, whose name was not mentioned, then inquired the result of the experiments with Dr. Van Monckhoven's developer, and was told in reply that, as yet, the experimentalists had failed to observe any advantage to be gained by using it.

The same gentleman then inquired what was the best way to construct a collodion filter. Various members replied, and spoke against the practice of filtering collodion, recommending the depositing of the impurities by standing as the best means of purifying it; but of all forms of filters the one most highly recommended was that in general use in this country, consisting of two parts filtering one into the other, and in which the deposit passes into the lower vessel, the mouth of which is filled with clean cotton-wool. A lid excludes the air.

Information was asked as to the best means of recovering the silver from the fixing bath, and as to Dr. Vogel's new and as yet unpublished method. Herr Quidde mentioned several methods, but added that, on the whole, he did not recommend muriatic acid or sulphuret of potash for throwing down the silver. Herr Prümm remarked that he had tried to recover the silver from his soda residues, but found that, though he did get a little more than when he sold the waste, the difference was not worth the additional trouble. Herr Lindner had experienced the same thing.

There was also a discussion as to the proportion of silver recoverable from the soda bath—a point on which there is great diversity of opinion. Dr. Vogel said that one great drawback of all known methods of recovering silver residues was their slowness; but by his method, which he regretted he was not yet ready to publish, the silver would be thrown down from the soda in an hour.

Correspondence.

ORGANIFIED PYROXYLINE.

To the EDITORS.

GENTLEMEN,—Men, oftener than they will admit, allow that the peculiar bias they may have received in childhood colours, and lends a sanguine tone to, any reasoning in harmony with the same. A similar mental process has become proverbial—in that he who tells the first story, should he be possessed of good powers of advocacy, has an opportunity not to be despised of giving a bias to the minds of his hearers. It is in the desire to secure that impartiality (which is the strongest evidence of a well-balanced mind) that leads me to ask a suspension of judgment in the above matter.

That I do not do so so without reason will be patent when I add that, at a time considerably before Mr. J. W. Gough published the formula in question in your ALMANAC, it was the subject of a conversation between that gentleman and myself, and most certainly I did not gather from him that he was indebted for his knowledge to another. In renewing this matter it is in the endeavour to prevent judgment being practically given against Mr. Gough in consequence of his absence from England. He only landed in Bombay on the 12th, and, as he had a considerable distance then to travel, his defence must needs be long in coming.

I am sure Colonel Stuart Wortley will pardon my intrusion in consideration of its being in the interest of that of which I believe him to be the possessor, namely, an unbiassed judgment.—I am, yours, &c.,

Halifax, February 18, 1876. W. E. BATHO.

CONVERSION OF HALOGENS.

To the EDITORS.

GENTLEMEN,—I was surprised to see that in your last issue I was credited by Mr. Berkeley with stating that iodine would displace bromine from bromide of silver, as it was quite different to a statement I made in *A Method of Producing Collodio-Chloride Films,* published on 27th March, 1874, in the contemporary photographic publication. I there state—"Similarly an iodised plate may be converted into a bromised plate by immersion in bromine water."

On referring to my letter to your Journal I find that it is printed differently to the above published statement, and I hasten to retract what I think must be a misprint. Let anyone try immersing a plate (coated with iodised collodion and sensitised) in a solution of bromine water. After ten minutes' time in a solution of medium strength he will find the whole silver salt converted into bromide. The order of affinity for silver of these halogens is Cl. Br. I., which is what we would expect from chemical considerations.—I am, yours, &c.,

Chatham, February 21, 1876. W. DE W. ABNEY, *Capt., R.E.*

EMULSION EXPERIMENTS.

To the EDITORS.

GENTLEMEN,—Will you allow me to thank Mr. G. W. Webster for his *Further Notes on Chemical Affinity?*

I can assure him that he has not offended my *amour propre;* but, really, I should *not* be so "green" as to mistake the meaning of the water becoming yellow. If he will refer to my letter again he will see that I wrote that the silver bromide became of a more pronounced yellow, *not* the "liquid." I have no doubt that the chlorine water was weak, though not decomposed, as evidenced by blue litmus paper. I have tried again with fresh chlorine water, and the liquid *does* become orange-coloured. When one quantity of the water had become as deeply-coloured as it would, I poured it off and added more. I have apparently succeeded in extracting all the bromine, but the resulting chloride is cream-coloured. Mr. Webster says that if too much chlorine be added the yellow colour (that is, I suppose, the bromine) will be re-absorbed. How is this? If we add only an equivalent of chlorine I presume that, according to Bunsen's law, the resulting compound would be half chloride and half bromide of silver, and that it is only on adding a large excess that all the bromine is displaced.

I have made another emulsion by Mr. M. Carey Lea's formula. It is about four times as rapid as the last I made, and mentioned last week, but that is not saying *much* in its favour. I should say that I make my emulsions with methylated solvents. It is possible that this might make the same work more slowly, though I am nearly certain that that is not the cause of my failures in this case. I coated some plates with the emulsion after it had been kept sixteen hours. These were organified in Mr. Lea's mixture (I may say that I use half as much again of gum and sugar as Mr. Lea recommends, and make a milky mixture, free from clots), and then washed and dried. One of these plates I found to be about as sensitive as the "Liverpool" emulsion; that is, five minutes' exposure at a foot distance from a paraffine lamp. I find that a "Kennett" plate requires about half-a-minute's exposure. A "Liverpool" is considered to be half as sensitive as a wet plate, and Mr. Lea's process, is, I believe, as sensitive as the wet; therefore, half this exposure should have been sufficient. Well, perhaps I should not grumble at the comparatively small amount of sensitiveness I obtained; so I proceeded to pour out (having added, this time, a drachm to the ounce of glycerine), allowed to set and organified the emulsion. It was then washed, and dried in a drying oven heated with paraffine lamps, the products of combustion passing through the oven (can this be the cause of my failure? It has only just struck me that this may be the case). The temperature did not not exceed 120° Fahr.

I do not think that the pellicle in any case requires any addition of plain collodion, though I obtained, perhaps, *slightly* less of the former than Mr. Lea experiences. In theory, for every three ounces of emulsion about ninety-nine grains of pellicle should result. Mr. Lea would make, I think, about ninety-three grains; I made ninety-nine grains.

I would here give a hint to those who have not yet made a washed pellicle. The broken-up pellicle will be hard and crisp long before it is really dry; therefore, care must be taken in drying the same. I have said that I use methylated spirits; this I use, as bought (sp. gr. ·823), for making the emulsion, but for dissolving the pellicle I use absolute methylated, purified by adding about one-eighth of a grain per ounce of silver nitrate, and sunning. This will throw down a copious precipitate. I am not certain of the best way of getting rid of any free nitrate; but a little of a chloride may be added cautiously, and also a little carbonate of soda to neutralise the free nitric acid. This latter I add more from theory than from the fact that I can detect the acid. I think that if a methylated sample of, say, ·823 were to be purified, the best plan would be, after sunning with silver nitrate, to add carbonate of potash, and thus get rid of water and everything else soluble in water; carbonate of silver would also be thrown down. I find that the absolute spirit, treated as first stated, seems to answer as well as the "rectified" for dissolving the pellicle.—I am, yours, &c., HERBERT B. BERKELEY.

Cotheridge Court, near Worcester, February 21, 1876.

DEVELOPMENT OF GELATINE PLATES.

To the EDITORS.

GENTLEMEN,—In your issue of the 18th instant, at page 83, Mr. H. B. Berkeley asks whether "any other worker uses an alcoholic solution of pyro. for gelatine plates."

I write, therefore, to say that I did so last summer in the development of Mr. Kennett's instantaneous gelatine dry plates, and did not observe any ill effects in consequence. I was not aware Mr. Kennett had condemned its use with his plates.—I am, yours, &c.

38, *Melville-street, Ryde,* HENRY W. DENNIE.
Isle of Wight, February 21, 1876.

[We are in a position to confirm Major Dennie's experience as given above, the last gelatine negative we developed having been done by a few drops of a one-hundred-grain alcoholic solution of pyrogallic acid in the requisite quantity of water.—EDS.]

EMULSIONS AND DIALYSERS.

To the EDITORS.

GENTLEMEN,—If the simple method of dialysis applied to a collodion emulsion described by Mr. Warnerke in this year's ALMANAC be an effectual means of washing it and removing the soluble salts, it would seem quite unnecessary to discuss the relative merits of the more troublesome and wasteful methods of arriving at the same end by either washing the pellicle or precipitating with water and afterwards redissolving.

The following is an easy way of making a substitute for the glass dialyser:—Procure a cocoa-nut shell and saw it in two; take one half and cut a round hole in the top which a cork will tightly fill; scrape out and smooth the inside with sand paper; then wet a piece of vegetable parchment and tie it tightly over the bottom, and the dialyser is complete. One for a gelatine emulsion may be made by sawing a ring an inch broad out of the centre of the shell, varnishing the inside with shellac, and tying the parchment over one end as before. It will then be like a small tambourine, and so light that it will float on the water provided only about an ounce of emulsion be dialysed in it at a time.

The gelatine emulsion being so much more easily prepared than the collodion, and at the same time more sensitive, cheaper, and free from all ether fumes, ought to recommend itself to all. Even were it less sensitive the absence of the ether alone (which I, for one, always found to be the great drawback to the use of collodion) should be sufficient to gain for it greater popularity—at least until something better is discovered.

I have a gelatino-bromide emulsion at present, which I made three months ago, and at the time added to each ounce a few drops of essence of cloves. I have used it at various times since, and it is better to-day than when first made, not showing the least signs of decomposition. I intend to try how long it will keep. The essence of cloves does not appear to diminish the sensitiveness in any way.—I am, yours, &c.,

February 16, 1876. L. S. D.

CARBON *VERSUS* SILVER.

To the EDITORS.

GENTLEMEN,—Now that carbon and silver are being weighed in the balance there is one circumstance which is likely to turn the scale in favour of silver. I allude to the recent heavy fall which has taken place in the price of that metal, and it is confidently expected that a

still greater reduction must take place. It appears there are mines in America where it can be produced in indefinite quantities at a prime cost of from two to three shillings per ounce; and at one mine, where it is largely mixed with gold, it can be produced at one shilling per ounce. The present value of silver for melting purposes is about four shillings and fivepence per ounce. Not long ago it was five shillings, consequently we ought soon to have nitrate of silver very much cheaper. These facts should give a great stimulus to the improvement of the stability of silver prints.

It is stated that carbon printing will require a more intelligent and careful class of assistants. This is just the very thing silver printing requires.

Competition and the rage for cheapness have caused the printing expenses of most establishments to be cut down to the lowest point, and what is really a most important branch of the business, and on which a photographer's reputation greatly depends, is turned over to a wretchedly-paid assistant, who has, perhaps, a boy or two under him. Essential details and niceties on which the permanence of the print depends are, from ignorance, neglected or ignored. It is, unfortunately, so easy to produce prints perfect to the eye, and so impossible to detect in them the seeds of rapid decay, that it is not to be wondered at that the underpaid printer "scamps" his work; and so long as his prints will pass muster at the time he has little further interest in the matter, as he is generally discharged when bad weather sets in.

Hitherto carbon printing has been in the hands of a few careful experimentalists interested in its success; but it remains to be seen how it will bear the rough usage it will meet with in the hands of the ordinary class of printers. It may then manifest defects and faults almost as bad as the fading of silver pictures.

Silver printing has been a good servant to photographers for the last twenty-five years, and there is every reason to believe it will remain so for years yet to come, as it is the best, cheapest, and easiest of all photographic printing processes.—I am, yours, &c., B.

P.S.—According to this day's *Times* the Mexican dollars by last arrival were sold at 52¾d. per ounce. This ought to cause an immediate reduction in the price of nitrate of silver.—B.

CARBON PRINTING.

To the Editors.

Gentlemen,—I do not know whether it has been previously suggested to use thick sheet rubber as the padding for placing at the back of the carbon tissue while printing. I use it for two purposes—to equalise the pressure and to preserve the tissue from damp. For the latter purpose it would suffice to use rubber cloth and felt behind it, and for large presses, where the expense would be a consideration, this plan may be preferred by many.

I have found that prints too dark to be used may be reduced by immersion in water, at about 100°, containing a small quantity of common soda—about a teaspoonful to the gallon.—I am, yours, &c.,

158, *Regent-street, W., February* 22, 1876. W. E. Debenham.

To the Editors.

Gentlemen,—In a communication in your last issue the Autotype Company argue, in favour of the permanence of their pigment prints, that their process had at the outset the advantage of the assistance of two scientific chemists—Messrs. Swan and Johnson—and an experienced colour manufacturer, Mr. Benyon Winsor; but if the tissue made during and since the connection of these gentlemen with the Company has produced prints which have faded in so far as the warm or purple colours are concerned the argument is not worth much—except, indeed, that it suggests the inherent improbability of the permanence of pigment printing when these colours are employed, if the gentlemen of whom they speak so highly were unable to overcome the difficulty.

It is affirmed, in another part of the Company's communication, that "pigmented tissues are now made which give results rivalling the finest photographs in brilliancy and colour, and, with proper treatment, absolutely permanent;" and in an editorial note in another part of the Journal it is assumed that this applies to the tissue now issued by the Company. This is a point of so much importance that it behoves them to be explicit, and it is desirable to know—Firstly, whether any, and if so which, of their tissues "rivalling the finest photograph in colour" are affirmed to produce prints absolutely permanent with proper treatment; secondly, what is the evidence of such permanence; and, thirdly, what is the "proper treatment," short of hermetically sealing and keeping in absolute darkness, that is required.

I may mention that of the Company's tissue I have experimented with I have found that a solution of permanganate of potash applied to a developed print upon glass discharges the carmine, or whatever the tinctorial substance may be; although, as in this case, it is replaced by deposited oxide of manganese, the half-tones do not suffer as they would under the fading influences of air and light.

The Company's communication also speaks of the yellow colour of old engravings as proceeding from the resinous varnish of the ink; but as the yellow stains are found upon the lights and margin, where there is no ink, this assumption is altogether unfounded.—I am, yours, &c.,

February, 22, 1876. Examiner.

ANSWERS TO CORRESPONDENTS.

☞ *Correspondents should never write on both sides of the paper.*

M. Carey Lea.—Received.—In our next.

J. A. W.—Ten grains to the ounce has been recommended.

P. G. Remondini (Genoa).—Remittance to hand. Thanks.

Junius.—We have not yet obtained the required information.

W. Kirk (Walthamstow).—The floral border is very chaste and artistic.

W. S. (Burnley).—Send the photograph with full particulars and eighteenpence in postage stamps. Mr. F. York is the publisher of the Museum series of pictures.

A. G. Clark (formerly of 1, Apsley-terrace, Stretford, Manchester).—We should be obliged to any correspondent furnishing us with Mr. Clark's *present* address.

Omicron.—We are not in a position to speak from experience concerning the relative degrees of rapidity of the two kinds of plate. With respect to the pyroxyline see reply to "T. R. R." in the present number.

⁂ We are still compelled to leave over much of the matter we have had in type for the last three weeks, but we hope to overtake most of the arrears in our next, including a review of the *Micrographic Dictionary*.

W. J. Smith.—We can only account for the slight difference between the two formulæ on the supposition that it was found, after greater experience, that the porportions of the bromide might be advantageously increased.

J. D. C.—If an article has been supplied to you which is faulty and incapable of doing the work for which it was warranted you have obviously a remedy in the county court. Our experience with a similar article from the same manufacturer was quite unlike yours.

Catherine.—The speckled appearance on the print arises from its having been insufficiently fixed. If a print has been immersed for the requisite time in a solution of hyposulphite of soda of a proper degree of strength it may then be transferred to a vessel of warm water with perfect safety; but if the previous immersion has been insufficient the mottled appearance inevitably ensues.

Effects in Portraiture.—Mr. Augustus W. Wilson has sent us three cabinet portraits in which there is a somewhat novel effect of lighting. Taking one of them as an example, the profile is in shadow, contrasting with a lightly-tinted background, the whole effect being most excellent. Apart from the peculiarity of lighting noticed the portraits possess a high degree of merit.

Bewell House (Hereford)—1. Any of the cameras mentioned will answer your purpose. The size we usually employ is $7\frac{1}{2} \times 5$.—2. The process described in the Almanac will yield excellent results. Try it, and if you fail to succeed write again.—3. We have not seen any examples of photo-tint except that in Tissandier's work, and that seemed to us to be printed by the lichtdruck process.—4. By shortening the tube the equivalent focus will be reduced.

David Scott.—1. Select that one of the various processes which appears most likely to answer your purpose; any of them will answer very well for enlargements.—2. Yes.—3. Four and a-half inches in diameter.—4. Two lenses, viz., a double convex and a plano-convex, the flat side of the latter being placed next to the light.—5. The proposed method is impracticable, and would lead to the fracture of the condenser.—6. The method we published is the best.—7. Anthony's cotton is not sold in this country.—8. To test the specific gravity obtain a hydrometer, or a specific-gravity bottle.—9. Use crocus mixed with oil spread upon soft wood.—10. Yes.

P. M. P.—Our correspondent inquires—"Would you be kind enough to give me in your 'Answers to Correspondents,' the formula for making non-actinic varnish *able to be retouched with the pencil or the stump?*"——We reply:—A varnish possessing the qualities desired may be prepared by dissolving sandarac and castor oil in strong alcohol, in the proportion of an ounce of the gum and eighty minims of the oil in six ounces of the alcohol. To this is to be added as much aurine as will cause the liquid to become of a deep orange. Varnish thus prepared will be non-actinic, and it can also be retouched with a blacklead pencil. It stands to reason, however, that if the varnish be absolutely non-actinic there will be no necessity for further increasing its density by means of retouching or stumping upon it; therefore, the addition of the aurine will have to be made sparingly.

T. R. R.—1. The cotton to which reference is made was obtained from Messrs. Rouch & Co.—2. The stronger the alcohol the better.—3. Under this heading a difficulty is stated by "T. R. R." as follows:—"At page 64 of the Almanac Mr. Sawyer says to put the piece of single transfer paper, 'glazed side uppermost,' on the pieces of tissue which have been placed on the collodionised plate. Now what is the use of that when the picture has not been developed? It would, of course, have to be taken off again. Is that not so? Possibly I am too stupid to understand the process correctly, but really this seems an error."——We believe the following to be the explanation of this seemingly obscure passage:—In applying friction to the back of a sheet of paper by means of a squeegee there is a chance of the paper or tissue becoming damaged, or dragged over the collodionised surface of the glass. To avoid this a sheet of paper is superimposed over the tissue, and the best kind of paper for this purpose is single transfer paper, the glazed side of which, when wet, is very smooth and slimy, and so permits the easy passage of the edge of the squeegee over it. Thin india-rubber cloth is used by some for the same purpose.

Exchanges.—In our next.

Sheffield Photographic Society.—A preliminary meeting, having for its object the formation of a photographic society in Sheffield, will be held at the Montgomery Schoolroom, Sharrow Head, on Tuesday evening next, the 29th inst., at eight o'clock. The attendance of those desirous of becoming members is earnestly requested.

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ON THE INFLUENCE OF DIFFERENT BROMIDES IN EMULSIONS.

It is our intention in this article to review the second portion of the paper read before the last meeting of the Photographic Society of Great Britain by Mr. Warnerke—a paper which will bear the most careful study of all emulsion workers. The portion to which we devote ourselves this week, which deals with the author's researches in connection with bromides of different bases and their effect upon the collodion film, is, if possible, of even greater importance than the first part of the article, devoted to pyroxyline and its varieties. It is a matter of the greatest surprise that, in view of the vast difference between the action of the bromides of cadmium and ammonium, emulsion workers have hitherto confined themselves almost solely to the employment of those two, though occasionally, at long intervals, suggestions have been made to introduce others—notably magnesium, iron, and uranium—but with little or no good effect.

As Mr. Warnerke remarks, the two first-mentioned salts may, perhaps, be considered the best, all things considered, for the ordinary collodion processes in which recourse is had to the silver bath in sensitising; but, considering the widely-different circumstances which exist between the two methods, it obviously does not follow that they should be equally capable of giving the finest results in the various emulsion processes. Besides, so various are the circumstances surrounding the use of an emulsion film, what may answer perfectly in one branch of that department of photography may easily prove itself entirely unsuitable in another—as, for instance, in the separate cases of an excess of silver or of soluble haloid. Here Mr. Warnerke shows that the bromide of iron, which may be employed in the latter case, is wholly useless in the former, on account of its reducing action upon the silver haloid. We may here remark, *en passant*, that a sensitive *emulsion* is in some respects a much more delicate matter than a sensitive *film*, while in other respects the opposite is the case. Thus, the presence of ever so small a proportion of reducing matter will be found frequently to discolour an emulsion *even in the dark;* while the application of the same quantity in solution to a coated plate would not produce the slightest effect, and that, perhaps, after exposure in the camera. We can only account for this on the supposition that in its liquid form it is in a more active state and more highly susceptible to extraneous influences of whatever kind, while after it is poured upon a plate and allowed to set the particles of sensitive matter are, as it were, locked up and isolated to a great extent from outside action.

Proceeding to the subject of Mr. Warnerke's experiments we find he has chosen the bromides of seven different bases, which were carefully tested one against the other, and also against a solution of bromine itself in alcohol. We cannot speak too highly of the elaborate care displayed by the author in rendering, to the best of his power, his experiments trustworthy. Discarding the theoretical combining proportions of the salts employed, Mr. Warnerke determined by actual trial the real equivalent of each, and then proceeded to perform the experiments upon a strictly uniform basis. The results of these preliminary trials, as tabulated at page 89 of our last number, are in some instances rather curious, and point either to impurities in the chemicals in general use or to errors in the theoretical equivalents as usually given in the text-books. The sample of silver nitrate may be, especially when procured from a good house, considered as beyond all suspicion; hence the calculations of the difference between the theoretical and practical equivalents, based as they are upon the equivalent $Ag\,NO_3 = 170$, point to grave discrepancies in the composition of our haloids.

These discrepancies in the case of cadmium, zinc, uranium, and, possibly, also potassium, are tolerably easy of explanation. In these cases the actual equivalent is found to be greater than the theoretical—a state of things probably caused by the presence of more or less water, either in the state of water of crystallisation or of merely accidental moisture derived from the atmosphere. In the case of bromide of iron, however, there appears to be something peculiar. Mr. Warnerke gives two *theoretical* equivalents, answering respectively to the formulæ of $Fe\,Br_2$ and $Fe\,Br$, with the latter of which the actual equivalent, as determined by the author, exactly agrees. But commercial bromide of iron contains as much as six equivalents of water, according to some of the first chemists; and, while the agreement between the real and theoretical proportions may be an accidental coincidence as far as the formula $Fe\,Br$ is concerned, it is not improbable that the empirical formula $\frac{Fe\,Br_2 + 3\,H_2\,O}{2} = 135$ will be found to explain nearly enough Mr. Warnerke's result. In the case of the bromides of ammonium and sodium, where the theoretical equivalent is greater than the actual, we have three alternatives to explain the discrepancy—1st, the haloids may have been partially decomposed, containing more than a due proportion of bromine; 2nd, the silver nitrate may have been impure; 3rd, the difference may arise from slight inaccuracy in conducting the experiments. However, the results recorded in the table only serve to attract attention more forcibly to the great importance of carefully examining the salts we employ, instead of trusting too blindly to their agreeing with the theoretical equivalents.

But now to proceed to the more practical results. It will be seen that the author confines himself in his experiments to one form of emulsion, viz., a bromised one with excess of silver. This, of course, does not give an idea of the probable results of the different salts when the silver is all converted and the soluble haloid in excess, and, further, it is possible, as Mr. M. Carey Lea has suggested in another connection, that even the variation in the amount of silver in excess may cause a difference in result. Still it cannot be denied that, so far as the experiments go, they testify abundantly to the possibility of introducing new salts into our hitherto limited collection.

The first result noted by Mr. Warnerke is suggestive, namely, the difference in density exhibited by the various emulsions. This point we have previously noticed when speaking of emulsions made from samples of pyroxyline of different degrees of solubility, or, rather, glutinosity. We attribute the difference to the greater or less restraining power which various collodions exert upon chemical combination, and which we imagine to be due to the glutinous or "horny" principle which exists in different proportions, according to the temperature and strength of the acids employed in the manu-

facture of the pyroxyline. But in the series of experiments under notice, though not expressly so stated, we presume the same sample of pyroxyline to have been used throughout, otherwise the experiments lose value. We are, however, certain that each emulsion contained the same quantity of silver bromide and chloride; whence, then, the difference in density? It can only be attributed, as Mr. Warnerke has done, to the special action of each of the various bases upon the collodion.

Whether such effect be permanent in each individual case, or whether it be similar in kind in each instance but requiring a greater or less time to reach its maximum with particular bases, we are not prepared to say, nor is it a matter of great importance, at least with washed emulsions; suffice it for us that at the moment of adding the bromide to the collodion an effect is produced which varies according to the base of the salt employed. This is a feature which has long been recognised in connection with collodion for employment in the bath process, and which has also received its share of recognition in connection with emulsions; but its bearing upon the latter is of much higher importance than in the case of a bath process. Bromised or bromo-iodised collodion prepared for use in, say, the ordinary wet process is usually kept a certain length of time until it is sufficiently "aged" to be capable of use. In forming an emulsion, however, the modern practice is to add to the plain collodion the necessary quantities of soluble haloid and of silver, and to complete the preparation in the course of a few hours. It is evident, therefore, that, if the effect produced by the different salts employed be progressive, all reaching the same point of excellence, but in varying periods of time, in the case of an emulsion which is bromised, sensitised, washed, and dried within a few hours we have no guarantee that the full effect is produced, and the employment of different salts will tend to bring about very great variety in the results obtained. In following out this inquiry, therefore, it is necessary to investigate the different properties of each individual salt, and to find which are the most suitable for special purposes—a task which the author has well fulfilled.

It is scarcely necessary to add any further remarks to the explicit description given in Mr. Warnerke's paper of the special qualities of the individual salts employed; it is sufficiently evident from his results that the zinc salt, which we do not recollect to have seen recommended previously, is the best in many respects—a fact we should not have anticipated from a metallic haloid. It is the most sensitive, easily intensified, free from liability to fog, sensitive to a point very low down in the spectrum, and, lastly, very soluble. Its only objection—a slight one, it must be confessed—lies in its extreme deliquescence.

In conclusion: we take a slightly different view of the question to that held by Mr. Warnerke. We think that the different metallic bases act upon the collodion in such a way as to produce very different effects of "ageing," and that thus certain salts allow of an emulsion to be sensitised immediately after bromising; while, on the other hand, if a due time be allowed for ripening, almost any salt will give a good result.

A NEW COLLO-DEVELOPER.

When in our number for August 13, 1875, we devoted an article to Mr. M. Carey Lea's important discovery of the "ferrogelatine," "collo," or "glycocoll" developer—for by these as well as by other designations is it known—we endeavoured to answer the question, "What is the best method of making this sulphogelatine solution so as to possess the maximum degree of efficiency in the developer?" In doing so we, followed soon after by Colonel Stuart Wortley, described slight modifications we had adopted.

By the publication of our article an impetus was given to a developer admitted by all who tried it properly to possess exceptional advantages, but which had yet been allowed to lie dormant to some extent owing to certain real or alleged difficulties encountered in its preparation, according to the skill of the maker, and, also, as is well observed in another column, because "photographers soon get tired of preparing anything out of their usual course, and prefer to do without it." All difficulties in, or objections to the general adoption of, the collo-developer of Mr. Lea are now likely to disappear; for our indefatigable *confrère* has once more "tackled" this subject, which he has made so peculiarly his own, and has eliminated from it every objectionable feature. He has now reduced it to such a state of simplicity and efficiency that the addition of a single drop of a stock solution to three ounces of iron developer proves not merely a substitute for such restrainers as acetic acid, but also ensures that wonderfully-fine deposit of silver attendant upon the use of his "ferrogelatine" developer, and which can only be appreciated to the fullest extent by those who, as we sometimes do, indulge occasionally in the production of very minute photographs intended for examination under the microscope.

Bearing in mind all that has been written on the subject, the question in our mind now is—whether the substance which performs the active part in restraining the developing solution, whether of iron or alkaline pyro., is identical with the product formed by the action of nitro-sulphuric acid upon the gelatine-impregnated cotton in Colonel Wortley's and Mr. J. W. Gough's processes. We think not, for various reasons. A small quantity of glycocine, made for experimental purposes some years ago, was found not to possess the restraining power attributed to the collo-developer, though when added to an ordinary acidified solution of iron it seemed to give greater density. Mr. Lea appears partly to agree with us in this respect, as he avers that glycocine does not act as a restrainer, but rather as a reducing agent. In this character it would be more likely to act beneficially in conferring density and probably also sensitiveness when added to the emulsion in the presence of free silver and a restraining acid, but then the question arises as to its solubility in alcohol and ether. Upon referring to Storer's *Dictionary of Solubilities* we find it variously stated as "insoluble" and "very slightly soluble in weak alcohol;" but even then it may be said that the merest trace only would be required, or that the necessary quantity might be added, dissolved in water, in which menstruum it is freely soluble. This is possible, but not having yet tried it we can only say that many substances so added to alcohol are immediately precipitated by abstraction of the water. The explanation suggested by Mr. Lea, of the increase of force secured by the addition of zinc to the collo-developer is ingenious, but will scarcely, we think, bear looking into. *Metallic* zinc in the presence of an acid will certainly reduce the haloid salts of silver, but when the zinc is converted into sulphate the solution will scarcely possess the same property. Meanwhile we recommend the most careful perusal of the article by Mr. Lea, in another column, to our readers, who, we feel assured, will not be slow to put in practice the directions there so clearly given.

THE INFLUENCE OF OZONE ON THE SENSITIVE FILM.

Since writing our previous article on this subject [*ante*, page 75] we have continued the experiments therein mentioned; but, in consequence of the difficulty of purifying ozonised air—a difficulty arising, we suppose, from the greater affinity of ozone for almost all substances—and from the ease with which that body is reconverted to oxygen, they have only been to a limited extent successful.

Our first experiments were made with ozone produced by the action of phosphorus on moist air. A stick of phosphorus was suspended in an ordinary gas jar standing on the shelf of a pneumatic trough, and in the mouth of which was fixed a bent glass tube and stop-cock—an arrangement by which any quantity of the ozonised air could be readily transferred to the vessel in which the plate was to be subjected to its action. This consists of a three-necked Woulff's bottle, the centre neck of which is a little more than an inch in diameter. The tube from the gas jar enters one of the necks, terminating when it has just passed through the cork; and through the other, on reaching the bottom, is a tube connected with an aspirator. When the Woulff's bottle is to be filled with the ozonised air it is filled with water through the centre neck, which is then closed, and the cock of the aspirator turned on, the result being

the drawing off of the water and the admission in its place of the ozonised air.

The plates used in our experiments were similar to those used by Professor Smyth in his photographs of the Great Pyramid, namely, ordinary microscopic glass, one inch by three, the sensitising, developing, and washing being conducted in two-ounce wide-mouthed bottles, the plates themselves being their own dippers. This is an arrangement which, from its great convenience and economy, we heartily recommend for experimental purposes. The experimental camera we have for some time had in use is simply a box $2 \times 2 \times 12$ inches with a locket lens of three inches focus in the centre, and an opening an inch square at each end. The square openings are provided with grooves, into which are slipped the prepared plate and the scale of tints to be photographed. The latter consists of a piece of glass an inch square, on which is fastened ten pieces of thin sheet gelatine of a very bright yellow tint, each piece being a tenth of an inch narrower than the one below it, thus making a scale of from one up to ten thicknesses. In this way the comparative sensitiveness of a film, or the relative intensity of various lights, can be very accurately ascertained by the number of lines that appear on development.

With apparatus so arranged we had no difficulty in getting with suitable exposures—both from daylight and the oxidation of magnesium wire, and also the condensed light of a paraffine lamp—all ten lines impressed on the collodion film; and then we proceeded to repeat the experiments, with the addition of subjecting the plate for various periods to the action of the ozonised air, by inserting through the centre neck of the Woulff's bottle. As in our former experiments, it was quite evident that the plates so treated lost sensitiveness in proportion to the time they were exposed to the ozone; but its action is comparatively slow, as complete insensitiveness did not set in till after an exposure of nearly half-an-hour.

The ozonised air, as we have already said, contained phosphorus in some form, and we were anxious to try it in a pure state. For this purpose we resolved to interpose between the gas jar, or ozone generator, and the Woulff's bottle a second bottle of the same kind, but with two necks, so that the air might be washed in water, or made to pass through such solutions as might be likely to absorb the impurities. In this way ozonised air was passed through the water, solutions of caustic potash, permanganate of potash, soda carbonate, baryta water, &c., &c., but with little other than negative results, as on testing the air for ozone, after having passed it through almost every one of the solutions, it could not be detected.

Plates that had been acted upon by the air which had been simply passed through water, and especially a mixture of alcohol and water, were decidedly less affected than those acted on by air not so washed, and so we tried the ozone produced by sulphuric acid on crystals of permanganate of potash. This produces ozone rapidly, and, when simply washed by water, it was found to be much less injurious to the sensitive film than that previously tried; in fact, an exposure of not less than an hour was required before complete insensitiveness was produced.

But the ozonised air thus produced was still very impure, and, as we could not think of any method of purification, we determined to try to get a supply by the electrolysis of water. As we happened to have access to a powerful Wilde's magneto-electric machine we managed to do so easily at the expenditure simply of manual labour. We arranged, of course, to get the gases delivered in separate tubes, and then mixed the liberated ozonised oxygen with the necessary quantity of pure nitrogen. The ozonised air thus produced we found much purer than that from any of the previous sources, and were somewhat surprised to find that it was a much more powerful destroyer of the latent image. Subsequent experiments, however, showed unmistakably that this arose from the fact that, volume for volume, it contained much more ozone than that from any of the other sources, as by the admission of ordinary air the effects were very materially lessened.

We need not go into the detail of the whole of the experiments, but will content ourselves with a statement of the remarkable results so far as we can ascertain them. Ozone, in the presence of the impurities with which it is always found when produced in the ordinary mode—whether by the action of phosphorus, sulphuric acid, and potassium permanganate, or the electric spark on atmospheric air—destroys the latent image rapidly, and it does so also in a less degree when quite pure. Its action, as might be anticipated, is lessened in proportion to the decrease of the quantity contained in any given volume of air. Its effect, when in proportion not greater than is to be found in the most highly-charged natural air—such as comes across large tracts of open sea—is so slight as altogether to escape detection. In other words, the amount of ozone in the most highly-ozonised natural air exerts no perceptible action on the most sensitive collodion film, and, therefore, we are constrained to say that for the undoubted influence of certain atmospheric disturbances we must look out for some other cause than ozone.

PRINT TRIMMERS.

We have no means of ascertaining to what extent the ingenious American invention known as a "print trimmer" is used in this country; that it *is* in use by many we are, however, well aware. The trimmer in question consists of a small steel wheel with an obtuse knife, or rather wedge-shaped, edge, which is fixed between sheers so as to revolve on a pin which passes through the axis. The piece of metal in which the wheel is fixed is set in a handle, in which it is capable of turning round easily in the same way, although not to the same circumscribed extent, as a glazier's diamond is set in its handle. In recommending photographers to take advantage of this little instrument we have no trade interests whatever in view, for indeed we are in ignorance to a large extent as to the channels through which they are usually supplied; but we have found the "trimmer" so handy for many purposes that we must be held excused for having thus given it a passing word of recommendation.

We now come to speak of the method of using the instrument, and of the means by which it is best kept in good working condition.

As regards its application to the cutting out of such mats as those for lantern slides we need say but little by way of recommendation, inasmuch as no other mode has been devised, short of stamping, by which an aperture in a sheet of paper can be cleanly and expeditiously cut. In effecting this operation it is only necessary that a thin brass or steel plate, having in it an aperture of the desired size and form, be placed upon the paper (which is laid upon a table or plate of glass) and the cutter made to run rapidly round the margin of the aperture of the guide plate, against which it must be slightly pressed, so that the paper is cut in a far more complete manner than when the severation is effected by a sharp knife. But it is alleged—and here arises one of the points of our remarks at present—that while the trimmer is perfect when applied to curves, such as circles, ovals, or cushion-shapes, it fails when applied to a sharp corner. This is quite true in one sense—that is, when it is required to cut exactly to the configuration of a square-cornered aperture in a guide-plate such as we have described. But this objection does not apply to the opposite kind of trimming—that is, the cutting round the *outside* of the "shape," which in this case must consist of glass in order that the picture be plainly seen; for what applies to the formation of clean-edged apertures in paper mats or masks, applies with equal force to *carte*, cabinet, or indeed to any other description of photograph.

We have recently devised a means by which pictures may be trimmed with perfectly sharp and square corners by means of the brass guide with an internal aperture, and we can strongly recommend it as fulfilling every requirement in connection with the rapid trimming of pictures. It is this:—Having obtained the brass guide-plate with its aperture of the exact dimensions to which it is desired that the print should be trimmed, apply a sharp, *thin* file to each corner in such a way and with such a result that each of the straight lines which meet to form the corner shall be carried a little way—say the eighth of an inch—into the solid metal. Each corner will thus present the appearance which characterises those of the well-known "Oxford frames." The use of these corner slits will be apparent. They allow the small circular cutter of the trimmer to

pass on to such a distance as to bring its centre opposite to the straight line of the guide, which is at a right angle to the path it has just traversed—a cut along the other path, or straight edge, effecting the same thing—the result being that an exceedingly sharply-trimmed corner is produced. The cutting of a picture to a dome shape by means of a guide piece prepared in the manner here described is thus rapidly accomplished without lifting up the cutter more than once during its circuit.

The rapidity with which prints can be trimmed by means of the little piece of apparatus here referred to is so much greater, and the results so much superior, to those secured by the old system that we feel justified in urging the matter on the attention of photographers.

We find that few, if any, seem to be aware of the best method of keeping the trimmer in proper cutting order. The grain of the cutting edge should not be concentric with the centre of the cutter, which would undoubtedly be the case if it were sharpened in a turning lathe, as is the practice of some; but it should be nearly at right angles to the periphery, or radiating outwards from the centre. To secure this all that is necessary is that the cutting wheel, without being dismounted from its setting, be dragged in an oblique manner over a rather coarse and flat oil-stone, such as that employed for sharpening carpenters' tools, the wheel being first of all applied to the stone so as to suit the bevel of the cutting edge, and then made to run along or over the face of the stone at an angle of about forty-five degrees to the line over which the wheel would naturally be made to run, and which should be at a right angle to the sheers or holder in which it revolves. This is the whole secret in the sharpening of cutters of this kind when intended to be used either for paper or glass.

GELATINE.—EMPLOYMENT OF THE DECOMPOSITION PRODUCTS RESULTING FROM THE ACTION OF SULPHURIC ACID, COLLO-DEVELOPER, &c.

About ten years ago I made the observation that gelatine, after being acted upon by sulphuric acid, was capable of exciting a very remarkable influence upon the action of the iron developer. These results were published at the time, and attracted a good deal of attention. As to the beneficial influence upon the development there was no doubt. The defects of the iron developer are well known, and are so serious that, although it gives a good image on a wet plate with half the exposure necessary for a pyrogallic development, yet it was a long time—many years, in fact—after its introduction before it passed into general use.

These defects are:—First, that its action is rapidly spent, or, rather, passes from that of a true development into a general deposit of silver, producing fog; second, that the deposit is never very fine, and sometimes quite coarse. It was found that the "collo-developer" cured both these defects. With its aid the action of the iron solution became regular and continuous; it could always be kept on until the desired degree of density was obtained. There was no danger of fog, and the texture of the negative was exceedingly fine; in a word, the new method united the advantages of the iron development with those of the older pyrogallic. The exposure was at least as short as with the ordinary iron, and the resulting negatives were particularly fine and clean. Redevelopment and after-intensification were absolutely got rid of, for the density desired could always be got with the first development. Of these facts there never has been any doubt, and, in particular, I may cite the very flattering testimony given by the late Mr. O. G. Rejlander when the method was first published. Quite recently Professor Piazzi Smyth has remarked upon the incomparably fine texture obtained. After speaking of the coarseness of grain which the microscope often discovers in wet plates, he advises to use a developer having "a liberal addition of Mr. M. Carey Lea's collo-developer, or sulphogelatine, and then, slightly varying according to temperature, exposure, &c., you will obtain a grain delightfully fine even under a magnifying power of twenty."* In fact, any amount of testimony might be brought to the same effect if it were necessary.

The question then arises—Why has not this mode of development passed into more general use? Probably because photographers soon get tired of preparing anything out of their usual course, and prefer to do without it. If it had chanced that this preparation had been produced commercially in its best forms the case would have been different, and it would, I think, have been largely used. It would be, even at the present time, very well worth while for some competent dealer in photographic products to manufacture it for sale, and in the course of this paper I shall indicate a method by which it can be prepared easily and inexpensively in a very concentrated form and of very high quality; for I remember well that most of those who used it at the time of publication did not prepare it in the best way, but used an older process, which was intended to have been superseded by subsequent publications. Towards the end of my investigations, which occupied many months, I succeeded in preparing the substance in a form which added to its other qualities that of giving *more detail* in both lights and shadows than the ordinary iron developer. The earlier form of preparation had not this advantage.

In the course of my examinations I devised several different systems of preparation, ascertained the proportions that did best with each system, and then compared the whole results:—

1. My first idea was to prepare with the aid of gelatine a sulphur-conjugated acid, which, united with iron, should carry an organic substance into the development. I therefore dissolved the gelatine in sulphuric acid, avoiding heat, and then, after diluting, saturated with iron in the form of filings, wire, &c., lastly adding a certain quantity of sodic acetate to avoid any large excess of the stronger acid, which would tend to make the grain less fine and less non-actinic. This method gave good results, and was extensively used. It was liable to the objection that it required a good deal of trouble to prepare a comparatively small amount of developer; and this fact, more than anything else, interfered with the extension of its employment.

2. My next idea was to prepare the product in a concentrated form without dissolving iron in it, and then to use it in connection with a solution of ferrous sulphate. I boiled the gelatine with not far from its own weight of sulphuric acid and some water. To get rid of the large excess of acid I neutralised with milk of lime, filtered, and then acidulated with a moderate amount of sulphuric acid. I made a large number of these preparations until I obtained the best proportions, which I published. The results were very good indeed.

3. I next tried to simplify this, and avoid the use of lime, by treating the gelatine with much less acid, using a quantity corresponding only with what in system 2 I had added in the last place. Results: tolerable only—not so good as either of the preceding.

4. The next method consisted in the introduction of nitric acid as well as sulphuric, by adding nitrate to the mixture. Nothing was gained thereby, although the experiment was much varied and very fairly tried.

5. I next came to the system which I finally adopted as giving altogether the best results.

In reviewing my previous experiments it appeared that the best results had been obtained by using a considerable quantity of sulphuric acid, and then removing a portion of it. Lime had been used for the purpose, and rendered a troublesome filtration necessary. I concluded to substitute *zinc*, believing also that by its reducing action under the influence of sulphuric acid the developer might not improbably gain in power. Whether or not this was the reason it is certain that the effect (increase of power) was obtained, and the result was the best of all. I therefore give detailed information for obtaining this product:—

Gelatine	6 ounces avoir.
Water	9 fluid ounces.
Sulphuric acid	6 fluid drachms.

It is not necessary to use fine gelatine; a good light-coloured specimen of common glue or, better, white glue answers perfectly well. When it has dissolved in the dilute acid the mixture is further diluted to twelve ounces, placed in a flask, and boiled for two hours. This boiling must on no account be done in an open vessel. At the end of two hours add an ounce of granulated zinc and boil an hour and a-half more. The action of the zinc is gentle, and the heat should be such as to just keep up a gentle ebullition. The sort of zinc is that in coarse powder; the fine dust of zinc is not suitable.*

The result is a brownish liquid with a restraining power that is almost incredible. To give the best results it requires to be diluted *fifteen hundred times* with iron solution. *One drop* of the liquid is to be added to *three ounces* of a thirty-grain iron solution. No acetic acid or other restrainer is needed, and, in fact, the greatest danger in its use lies in the difficulty of believing that so small a quantity is sufficient. With too large a dose the results are naturally unsatisfactory.

I think I need scarcely point out how well this process is adapted for commercial manufacture. In a few hours, with little trouble and

* The British Journal Photographic Almanac for 1876, page 38.

* I find by my note-books that this process was obtained in January, 1867.

of inexpensive materials, there can be obtained, by using four or five times the quantity of material indicated in the above formula, several pints of product, a single ounce of which will suffice for an enormous amount of photographic work; as one drop suffices for three ounces of a thirty-grain iron developer it results that one ounce of the product will make 1,500 ounces of developer, and develope about 1,500 whole-size plates. This certainly seems almost beyond belief, and yet it is a simple fact.

Although but one-third of a drop enters into the development of a whole-size plate the character of that plate is utterly changed. The texture of the negative is incomparably finer, its tone is changed to a slate-colour, there is more detail in both lights and shadows, and it is almost impossible to fog the plate.

It has been assumed by many that, because *glycocine* is one of the principal products of the action of sulphuric acid on gelatine, therefore the collo-developer owes its restraining power to the presence of glycocine. Some have even gone so far as to change my own name for it to that of "glycocine developer," which is a complete misnomer, and is founded on a mere assumption. The developer undoubtedly contains glycocine, but does not in the least owe its restraining power to that substance. I obtained ample proof of the fact, years ago, by preparing glycocine and trying it with an iron developer. It showed no restraining power whatever; the iron solution, when placed in contact with silver nitrate, produced immediate fogging. Glycocine has its own photographic properties; it is a reducing agent, and is capable of giving great sensitiveness when used as a preservative for dry plates. I employed it for this purpose half-a-dozen years ago. It has also other valuable properties in photographic work. But the collo-developer depends for its characteristic properties on some quite different substance contained in the solution. I have not been able to isolate this substance; I can scarcely believe it to be leucin, and it is certainly not tyrosin. It rather appears to be a colloid substance, quite uncrystallisable, that has probably never been separately obtained.

I notice that it has been proposed to add *glycerine* to the collo-developer. This would be an utter mistake. The action of glycerine on an iron solution used for a developer is perfectly well understood, as also its action on dry-plate work. It gives clearness of image, but at the expense of both sensitiveness and detail, tending to bare glass shadows. The collo-developer, when properly made, gives the same cleanness of image without reducing sensitiveness or diminishing detail. If such a substance as glycerine be wanted in its action it simply proves that the collo-developer has been badly prepared and is worthless. In fact, a collo-developer prepared as here recommended not only gives all the detail that would be afforded by an ordinary iron developer, but, more, with all the cleanness that can be desired. The addition, therefore, of glycerine is not only an unnecessary "complication," but a direct injury; it cannot be otherwise.

Next week I propose to send some remarks on the preparation of glycocine and its use in photography. M. Carey Lea.

GELATINE IN EMULSIONS.

When I found the great advantage secured by the addition of sulphuric acid to an emulsion I made various experiments to determine whether or not the addition of glycocoll to an emulsion was an advantage. It certainly gives, as we should expect, greatly-increased density, but accompanied with its characteristic feature—insensitiveness. In my opinion sensitiveness in a negative process is a paramount desideratum, and therefore glycocoll is, in my opinion, inadmissible.

Gelatine is, however, also soluble in acetic, hydrochloric, and nitric acids. I do not find it a desirable addition dissolved in acetic acid, a strong tendency to fog remaining in the emulsion, and, if dissolved in hydrochloric acid, the undesirable qualities brought into an emulsion by the addition of a chloride forbid its use.

It is an odd thing that two qualities of a chloride—namely, a tendency to fog under prolonged development and a fading away of the image after having been brought out—are not cured by the addition of gelatine, contrary to my expectation. There remains, then, nitric acid. Used in an emulsion this acid has the same effect as it has in the bath process in the production of a thin and weak image, unless a density-giving pyroxyline be used; but if the nitric acid be saturated with gelatine before addition to the emulsion its tendency to give a thin image disappears, and a vigorous negative is the result. For a washed emulsion this method of working is of peculiar value, owing to the density given to the negative without the necessity of organifying the pellicle—a process uncertain in its effects, and leading often to troublesome failure. But, for those who will take the trouble, gelatino-bromide treated by Mr. Johnston's method, and then redissolved in alcohol, offers a better means than any other of getting gelatine into a collodion emulsion, as it is miscible in large proportion; and, as it carries sensitive bromide of silver with it in due proportion and no acid to exercise a retarding influence, we get the advantages offered by its use with no disadvantages at all.

I fear, however, that all these modifications are of interest to but very few of your readers. Few will take the trouble—I may, indeed, say labour—of experimental work; and too many are wrapped up so completely in their own ideas, and think their own modifications and negatives so perfect, as to be unwilling to acknowledge any suggestions for improvements made by others. Still, those who care to have the results, from time to time, of my search after improvements, are very welcome to them.

If I notice a letter addressed to you by Mr. Batho it is only to remind you that I hold Mr. Gough's own letter acknowledging having taken the "organic-pyroxyline" idea from me—more than which I do not require. "*Litera scripta manet.*"

H. Stuart Wortley.

NOTES ON PASSING EVENTS.

By a Peripatetic Photographer.

The discovery of the method of tilting a camera by pulling back one of the legs of the stand until it takes the ground at the opposite side of the triangle screw from that to which it is attached reflects credit upon the ingenuity of Sir Thomas Parkyns. I have already utilised this hint by taking a "shot" at a mass of beautiful clouds which were situated at an altitude too great to have been conveniently taken otherwise than by resorting to the baronet's tilt. For photographing clouds the method in question will be very useful.

In these days of spelling bees, when the selection of a standard of reference is a matter of importance, I have been asked whether So and So—by whom are meant the author and the publisher of a useful work on silver printing—may be accepted as authorities in the orthography of the technical terms employed in their business. Having committed myself by an affirmative answer, I am now asked which of the following methods of giving oral expression to our common fixing salt is correct—"hyposulphide," "hyposulphate," and "hyposulphite"—all of them being found in one page of the work referred to, and obviously intended to represent the same substance. Well, this only proves that the work in question must *not* be accepted as a standard of reference in orthography at least. Doubtless the honest printer of the book had never observed the word in the whole course of his previous experience, and thought that, if not in one way at least in another, he would make sure of it eventually.

I don't know that I enjoy any articles appearing in the Journal with more zest than the series on *Recently-Patented Inventions* at present in the course of publication; and I know that I am far from being alone in such gratification. It is not a little ludicrous to read an elaborate account of some invention which, doubtless, the fond parent imagined was to bring him fame and wealth, but which, after having had all honour awarded to it and its importance duly recognised, is quietly cornered by the announcement that it was patented or published ten, twelve, or twenty years ago. History repeats itself; does invention and discovery also follow the same course? But it is only fair to the inventive faculty of the age to admit that, while there is so much of that kind of thing indicated in the Scottish saying, "Cauld kail het again," among the patented inventions of the present day, there is also to be found much possessing sterling merit, as will, I have no doubt, be shown in subsequent articles of the series.

The foregoing paragraph suggests a few thoughts on the "albatype plates" recently patented. Now it is well-known that albatype plates which have been utilised in the collodio-chloride process have, in some well-known instances, had their whites degraded to a very sensible, if not serious, extent so far as respects the portions exposed to light. The parts shielded from the light by the margin of the mat have remained white, while the exposed portions have become tinged with yellow. To what is this to be attributed? It is so difficult to understand how anything left in the whites of the collodion film can darken by exposure to light, one is prompted to inquire whether the change by exposure is not owing to the pigment employed in the production of the enamel itself. Oxide of zinc is, I find, the pigment pre-

ferred in the preparation of the plates according to the late patent; but I have never heard of any instance in which this pigment has become changed by light. It is true that the patent process in question may not necessarily be that by which the plates were produced that darkened in the whites. The matter is of some consequence, because if, as you suggested a short time ago, these plates come into general use in this country for carbon printing, it will be well to eliminate every thing of a suspicious and fading character from them. That plates of this kind *will* be extensively employed in connection with pigment printing cannot be doubted by anyone who has tried them. They possess all the beauty of opal glass *sans* its fragility, and for this reason they offer the best possible basis for coloured carbon prints of the highest quality.

But *does* the insuperable objection to developing negatives by the dipping-bath, as hinted at by the Editors, really exist? Cordially acknowledging the soundness of the premisses that a developing solution must only be used once, there is a little fact that seems to be kept out of sight by the numerous objectors to the bath method of developing, which is this—that it is not at all necessary that a developing solution be used twice. It will be asked—"Would you refill the dipping-bath with fresh solution in the case of each plate to be developed?" Precisely that, and nothing more nor less. But in anticipation of the objection as to the enormous wastefulness of the means to the end in such a case—the burning down of the cottage to roast the pig—I remark that a dipping-bath for developing can be so made as to require very little more of the solution than is used in developing by the method of pouring it upon the surface. It is merely a matter of capacity of the bath. I have just had a dipping-bath constructed with the specific view of deciding this matter, and I find it can be worked with a very great deal of economy. It is so narrow that it takes in the plate freely, but nothing more. The consequence is that if a few drachms of solution be poured into the bath, so as to make it about one-third full, the insertion of the plate to be developed causes the solution to rise and cover it completely. When the development of the image has been effected the used solution is poured away, and fresh developer employed for the succeeding plate. If the developer be really all that stands in the way of the dipping-bath system of sensitising and developing plates in the camera—*that*, I think, is a barrier which, from the hint I have given above, will soon be broken down. Attention was directed by a speaker at the last meeting of the South London Photographic Society to the perfection of the small Egyptian negatives of Professor Piazzi Smyth. Well, these negatives were all developed by the dipping-bath method; and this serves to show that there is nothing inherently wrong in the method itself when once the best means for carrying it out have been determined.

One of the most irritating things in the world is to read an elaborate account of something which is very desirable—to be informed of its many virtues, the great successes achieved by it, and to have a strong conviction of its being *the* very thing after which you have so long been hunting—to know all this, and then have the subject coolly dismissed without a word of description! Such were my feelings when reading the report of the last meeting of the Manchester Photographic Society, at which was exhibited an apparatus for producing oxygen gas while being used, and in quantities exactly proportioned to what is required. Will one of the gentlemen—Mr. Noton, the originator of the oxygen generator, or Mr. D. Young, the exhibitor of the "elaboration" of this generator—kindly volunteer a description of it for the benefit of his fellows? Such a description would indeed be greatly prized by many.

Did Mr. H. J. Newton fall into a state of somnolency over his Journal, and forget that he had read certain things which must have left some impression on his brain before he could have reproduced them in the manner he has done? I do not imagine that he would knowingly appropriate any of Mr. M. Carey Lea's processes without making due acknowledgment of the same; but, as the matter now stands, Mr. Lea has reason to feel dissatisfied with his transatlantic brother. The matter has, however, been so justly, yet temperately, alluded to in Mr. Lea's last contribution to the Journal that there is no necessity for me to do more than refer to it. "Fair play is a jewel!"

Dr. Stein, of Frankfort, who has been encountering the spiritualists and spirit-photographers at Brussels, will doubtless feel surprised that after explaining, at least to his own satisfaction if not to theirs, how "ghosts" were photographed, he was unable to shake the faith of the believers. The good Doctor must be possessed of a very limited acquaintance with the knowledge possessed by spiritualists relative to the various methods by which such pictures *may* be made without detection if he imagined that the faith of any of them was to be disturbed by his use of the "transparency method" in their production, which is *the* process employed by the merest tyros in that department of "illusive" science. He will have to delve somewhat deeper than this if he desire to discover the methods employed by some of the more experienced spirit-photographers, who will allow even sharp-sighted and sharp-witted "experts" to be present and watch every operation to which the plate is subjected, from its being cleaned to the varnishing of the negative, and yet produce pictures of the ghost *genus*. By the way, Mr. Thomas Slater, the well-known optician, of Euston-road, has recently made a statement in public to the effect that he is a confirmed believer in spirit-photography, such belief being the result of numerous experiments made by him in the privacy of his own dwelling. What next?

FOREIGN NOTES AND NEWS.

Hyalo-Typography.—Herr Schlegel's Method of Transferring Carbon Pictures to Stone.—Two Princely Photographers.—Exhibition at Berlin.—Fargier's Carbon Process.—Durable Silvered Paper.

According to the *Journal für Buchdruckerkunst*, the number of the already numerous methods of obtaining etched plates that can be printed in the ordinary letterpress printing-press has been augmented by yet another method called "hyalo-typography." A glass plate is coated with a clear green or yellow background, upon which the draughtsman draws with a steel or ivory needle as with a pencil. Every stroke of the needle uncovering a part of the glass, this method can only be applied to drawings in the line or stippled manner. The artist judges of the progress of his work by placing a piece of black paper under it. The finished plate is printed from exactly like a photographic negative, as the light is only transmitted by the clear places. The print so obtained is then transferred to a zinc or copper plate, and etched in the ordinary way until the lines stand out in the desired degree of relief. It is claimed for this process that it is as easy to draw upon the prepared glass as upon ordinary paper with a lead pencil. From the foregoing details we judge that the process is, if not identical, almost so, with that introduced some time since by Messrs. Malloch, of Edinburgh.

Herr Schlegel, in the *Photographisches Archiv*, gives the following description of a simple and certain method of transferring a picture in fatty inks to stone:—A carbon print is developed upon paper coated with lithographic varnish or fatty inks. The picture is then pressed upon the stone, and the paper, being rubbed with oil of turpentine, is removed from the stone and the carbon print is transferred. The negative must, of course, be lighted, developed, and intensified until the lines are clear.

Prince Galitzin Ostermann was recently admitted a member of the Berlin Photographic Society.

The Bohemian contains a very favourable critique on the works of another princely photographer, Prince Franz von Lobkowitz, son of Prince Johann von Lobkowitz. The Prince is said to be perfectly master of the dry processes, which he has practised for ten years, and also to possess a very fair theoretical knowledge of the subject. He has two studios furnished with all the newest instruments and accessories. He is at present engaged in photographing all the more remarkable castles and towns in Bohemia. When this task is completed the result will be a very interesting series of pictures.

The *Archiv* mentions that from the 15th of May to the middle of September there is to be an international exhibition of art-industry and science as applied to the training of youth and to popular culture, in the park of the Castle of Schönholz, near Berlin. The programme of the exhibition is divided into fourteen groups, one of which includes photographic and microscopic apparatus and productions.

In the same paper Dr. Liesegang gives an account of Fargier's new carbon process. A sheet of paper is floated upon a solution of five grammes of chloride of iron and five grammes of citric acid in 100 grammes of water, dried, and lighted under a negative until a faint image appears. The picture is allowed to float upon a coloured solution of gelatine, which adheres to the exposed parts, and, after being washed in warm water, the picture is ready. Dr. Liesegang says he should like to see the process simplified by the

substitution of carbon paper softened in water for the gelatine solution, perhaps in the way in which it was pressed upon chloride of iron paper, and then the first floated off in warm water. If good results could be obtained in this way the carbon process would be very much simplified, as the pictures would not require any further transferring, and would also be visible in the pressure-frame. This is, however, merely a suggestion which Dr. Liesegang himself does not appear to have put to the test of practice.

The *Archiv* seems to have taken a deeper or, perhaps, more minute interest in the newly-passed German copyright act than either of the other photographic journals, as it has published *verbatim* the shorthand report of the debate in the Reichstag.

It is also mentioned in the *Archiv* that an American, named Mr. Devey, has discovered a method of keeping silvered paper white for several days. What is required is a box two feet in height, the bottom of which is a foot square. Five inches above the ground is a perforated false bottom, the space under it being filled with cotton-wool saturated in citron oil. If unfixed pictures be laid in the upper part of the box they will remain quite fresh for several days. Paper prepared with chloride of silver, especially if a little citric acid be added to the silver bath, keeps for weeks or even months quite white. This box should not be kept in the developing dark room, as the exhalations from the citron oil is apt to cause the negatives to fog, and lessens the sensitiveness of dry plates.

THE CHLORIODO-BROMIDE PROCESS.

In the number of The British Journal of Photography for January 14, received in due course, Professor Stebbing, in writing from Paris, makes friendly mention of a discussion on the subject of washed emulsions made by this process, and alludes to a complaint of non-success in trying it. One suggested explanation was this—that the gentleman who had tried it unsuccessfully had found, on adding the cupric chloride, that a precipitate was produced. Professor Stebbing "told the gentleman that he should have added the cupric chloride after the silver, as was done by the Editors of The British Journal of Photography," and refers to page 182 of last year's volume.

It is curious enough that there is no allusion whatever made to the matter in question by the Editors in the page referred to, nor, as far as I have noticed, at any other place. Some weeks *before*, viz., at page 122, I specially mentioned that in making a chloriodo-bromide emulsion the cupric chloride should be added after the sensitising, and even italicised it to attract particular attention. This was in describing the chloriodo-bromide emulsion. In the description of the washed emulsion process a little later, at page 172, it appears that I omitted this detail; but, two weeks later (page 196), I advised to reject cupric chloride altogether, and substitute *cobalt* chloride, adding it half-an-hour to an hour *after* the silver, and again italicised the word "*after*." Professor Stebbing will, therefore, see that I myself, and not the Editors, as he supposed, remedied this omission. In fact, the recommendation to add the chloride last had been so often repeated that it seemed almost superfluous. I rejected cupric chloride because I found that this substance, as prepared commercially, varied very much. At that time I had just procured a new lot of it, which differed extremely, even in appearance, from the previous, and gave very bad results—results which I could not at first explain, but finally traced to the copper salt. This uncertainty was abundant reason for discarding it *in toto*. As for the capabilities of the process it is sufficient to refer to the experiments published by the Editors, by Mr. Henry Cooper, and, in the last British Journal Photographic Almanac, by Mr. Alexander Henderson, of Montreal.

Probably, therefore, in one way or the other, the copper salt was the cause of the non-success encountered by Professor Stebbing's friend, and I would take it as a favour if Professor Stebbing would call that gentleman's attention to the present remarks.

Perhaps it may be as well to go over very briefly the sources from which error may most easily spring, and the essential details of working, to which last I have one or two new observations to add.

Pryoxyline.—In places where emulsions are not used it is next to impossible to get cotton that is suitable, and without it entire failure must be the result; that is, thin and unsatisfactory images which cannot easily be brought up. The only course that I can suggest is to find some friend who is successful with emulsions, washed or otherwise, and to procure cotton from the same source. Professor Stebbing's Paris friends might procure it from Mr. Mawdsley.

Aqua regia not to be forgotten. *Chloride* added an hour after sensitising, using the cobalt salt. In *emulsifying* the bottle to be not over one-third full; to stand for twelve hours, with a good shaking shortly before using.

The general details are:—*Collodion* to be made with equal parts of good alcohol and ether, and to each ounce of mixed solvents add—

Pyroxyline	8 grains.
Cadmium bromide (commercial crystallised)	9 ,,
Ammonium bromide	$2\frac{1}{2}$,,
Ammonium iodide	2 ,,

This should stand some time—a month, if possible—in a warm room and in the direct rays of the sun.

When the emulsion is to be made add for each ounce of collodion two drops of *aqua regia*. Dissolve by heat in a few drops of water for each ounce of collodion twenty-five to thirty grains of silver nitrate (I generally take about twenty-six, and use the fused nitrate); then add to this solution three or four times its bulk of alcohol, and heat till the precipitate redissolves. Add this in portions to the collodion, shaking well, and an hour after add for each ounce of collodion two grains of cobalt chloride dissolved in alcohol, shaking well. (The *red* chloride makes a *green* solution; this is owing to dehydration by the alcohol, and does not indicate anything wrong in the material.)

Very likely when the silver is first added it will not emulsify well, but the mixture may seem flakey; it may or may not do so. This is of no importance. The experimentalist has only to go on, add the chloride in due time, and shake well. Twelve hours after (let us say next morning; it is most convenient to prepare the emulsion overnight), on giving a good shaking, the emulsion will be found to be perfect. It may then be treated either with or without drying. If it is to be dried pour it out into a pan, the layer of liquid to be not over a quarter of an inch deep, and wait till it is rather leathery. This will require from one to four hours according to the thickness of the stratum. Pour over it the preservative (coffee, gallic and acetic acids will do, but the preservative fully described at page 22 of this volume is far better). Break up with a spatula, transfer all, flakes and preservative, to a large glass jar, and leave in contact twenty minutes; then wash very thoroughly. Pour off the liquid very close, fill up with water, stir well, and pour off again. Do this about half-a-dozen times, let stand an hour, and then repeat half-a-dozen times or more. Squeeze out, press with a pad of clean filtering-paper, and spread out on a pan to dry; complete exclusion of light throughout; cover the pan while drying with yellow paper. Or pour the emulsion into a glass jar and pour the preservative directly into it. In this case there must be at least *four* times as many ounces of preservative as of emulsion (in the other way *three* times as much is sufficient). Let stand twenty minutes, and then wash by decantation as above described, and dry perfectly. Heat that can be borne by the hand will not injure the pellicle. The last method gives much the most soluble pellicle, and entails no loss of material. The former gives a result perhaps a shade more sensitive, but the difference is slight.

In re-emulsifying, for each three ounces of original collodion take ether and alcohol, each one ounce, four grains of plain collodion two ounces—in all, four ounces. I always use the same pyroxyline for the plain collodion, though I am not certain it is necessary. I find it does not answer well to add pyroxyline to the final emulsion, because the undissolved filaments which remain are themselves emulsified—are suspended in the emulsion, and do not settle as they do in collodion. They are difficult to filter out, and it is much better to use collodion. This was my first plan, and should not have been changed. Give a week to re-emulsify, with frequent shakings. Filter; edge the plate with rubber dissolved in benzole. Before coating brush the plate thoroughly with a bristle, not a camel's-hair, brush.

To develope, place the plate in water in a pan to which has been added twenty minims of a sixty-grain pyrogallol to four ounces of water. After a few minutes remove the plate and add twenty minims of a thirty-grain bromide and twenty minims of an eighty-grain ammonium carbonate, made of translucent carbonate, and not kept over two months after dissolving.

If brighter negatives be wanted put the plate into water only (which should be free, or nearly so, from chlorides), and then, first removing the plate, add the same substances in same proportions as before. The dose of carbonate may be doubled or tripled after the image appears if density do not come rapidly. (This may be done in either form of development.) For fixing, dissolve five ounces of hyposulphite in seventy of water—say five and a-half per cent. This may be kept on hand, and a portion taken for each batch of plates developed, and then rejected. M. Carey Lea.

INTENSIFICATION WITH LEAD: A NEW METHOD.

Amongst the various methods of intensification it is difficult to define one which, without fogging, will intensify very powerfully a weak and thin negative (under-exposed, as it often requires to be when it is a reproduction of a line engraving). Intensification with mercury or uranium (the methods whose pretensions most nearly meet these claims) is now seldom or never used, on account of the instability of the pictures obtained with them. Intensification with silver cannot be carried beyond a certain degree of density without injury to the clearness of the picture. One should, therefore, only intensify slightly with silver and then use another intensifier which can act longer upon the negative without fogging—gold, platinum, sulphur, and soforth. Intensification with sulphur or Schlippe's salts cannot be charged with instability; but, unfortunately, one cannot obtain a sufficiently-dense negative with either of them without previous intensification with silver.

With our method of intensification denser pictures can be obtained than with either uranium or mercury, and these perfectly stable. In what follows we describe a new method, which we will call "intensification with lead." In order to preserve completely the clearness of the lights of a somewhat under-exposed and fixed negative it is washed first with common, and then with distilled, water; after which it is laid in a filtered solution of—

Nitrate of lead	4 parts,
Ferricyanide of potassium	6 ,,
Distilled water	100 ,,

and allowed to lie there until the blacks become opaque. If acetate of lead (sugar of lead) be used instead of nitric acid (five parts in 100 parts of water) the bath will work as well, but possesses the disagreeable property of becoming slightly turbid when exposed to the air, so as to necessitate frequent filtration. More diluted solutions than the above—for example, one part of nitrate of lead and one of ferricyanide of potassium in 100 parts of water—work very well, but require longer time; more concentrated solutions than ours crystallise easily, and sometimes the crystals are deposited upon the immersed negative. The crystals thrown down are ferricyanide of lead, and they form beautiful garnet-red columns.

If one proceed to intensify with lead immediately after fixing, and without allowing the negative to become dry, the intensification is completed in a few minutes; but a negative that has become dry, even if distilled water be poured over it before it is placed in the bath, must be left there much longer, the process often taking from six to eight hours to complete. This is also the case with other intensifiers, such as Selle's and chloride of platinum.

It is, therefore, advisable to set about the intensification as soon as possible after the fixing, and, should the negative have already become dry, to moisten it by letting it lie some time in distilled water. If one be not deterred by the length of time required the expenditure of time will be amply repaid by the result, which will be that very weak negatives, formerly considered useless, will have become perfectly opaque in the blacks.

A pale, yellowish-white precipitate is deposited by the action of the lead bath on the silver parts of the picture, which gives the entire picture a white appearance and possesses extraordinary density. The negative must be left in the lead bath until it has almost reached the density aimed at, because the subsequent treatment with sulphide of ammonia has less in view the increase of the density than the rendering of the picture permanent.

The preceding is analogous to the intensification with uranium. The silver acts as a reducer, so that the red ferricyanide of potassium is converted into yellow, and with the plumbic salt forms an insoluble compound—ferrocyanide of lead.

The question is, then, how to convert the unstable lead compound into a stable and, perhaps, better covering compound—an end attainable by the action of sulphide of ammonia. After the negative has been removed from the lead bath and well washed with distilled water it is coated with sulphide of ammonia diluted with from one to five parts of water (of course it is understood that a solution of liver of sulphur can also be employed; and with regard to the previous washing it should be continued until the colour of the negative has become almost pure white. If one wish to be absolutely certain that the plate has been perfectly washed, one has only to let a few drops of the water used for washing it fall into a little iron developer, and if the liquid do not become perceptibly blue then the washing has been continued long enough). When sulphide of ammonia is poured over the negative the picture becomes black almost instantaneously; and when the blackening has penetrated to the back of the film rinse the sulphide of ammonia well off with common water. In this way the greatest transparency of the lights along with intense opacity of the blacks is obtainable.

As intensification with iodine and subsequent treatment with sulphide of ammonia is at present in general use in photolithography, but a very simple experiment will be sufficient to convince any one of the great superiority of our method over the latter. Let one half of a negative be intensified with iodine and sulphide of ammonium, and the other half with lead and sulphide of ammonium; the density of the first will be found to bear to that of the second a proportion like 1 : 3.

The solution of lead keeps for weeks, and even months; but as it becomes older it works more slowly, and a part of the ferricyanide of potassium gradually becomes decomposed, so that some half or quarter of the original quantity of nitrate of lead and red ferricyanide of potassium must be added. It is advisable to filter the bath frequently.

Should the negative not become dense enough—even after lying a long time in the lead bath, as may happen with a very thin negative—the means of increasing the density is ready at hand. This is sulphate of cadmic oxide, of which ten grammes should be dissolved in eighty or one hundred c. c. of distilled water. The negative, lifted out of the lead bath and well washed with distilled water, is placed, before it has had time to become dry (the former remarks as to the disadvantages of allowing it to dry are applicable here also), in this new solution. The appearance of the picture is not changed, or, at most, it only becomes a purer white. It is then lifted out and again washed with distilled water, then coated with sulphide of ammonium, and, lastly, well washed with spring water.

The action of the cadmic sulphate is explained in the following way:—The sulphate of the salt combines with the lead in the picture, setting free the ferrocyanide, which was formerly in combination with the lead, to combine with the cadmium to form insoluble cadmic ferrocyanide, so that the lead, as well as the cadmium and silver in the picture, are converted by the sulphide of ammonium into metallic sulphides.

Cadmic sulphide being known to be yellow, negatives obtained by the foregoing treatment with cadmic sulphate are distinguishable after the final treatment with sulphide of ammonium from those only treated with the plumbic solution, as the former remains yellow while the latter is perfectly black. The density of a negative intensified with lead and cadmium bears to one intensified with lead only a proportion of about 4 : 3.

If one replace the sulphide of ammonia by an ammoniac solution of Schlippe's salt (about ten parts of salt in 100 parts of water, and five of *ammoniæ fortissima)* the negative turns a very pretty reddish-brown, and is rather more dense with sulphide of ammonia. In spite of that we do not recommend Schlippe's salt, because it is very unstable, not only rendering the manipulation difficult, but often causing fogging of the negative as well. A solution of this salt without the addition of ammonia we put aside together, because it becomes turbid immediately on being exposed to the light; nor can the fluid be even kept clear enough to work with by frequent filtration, as, during the operations, the precipitate caused by the influence of the atmosphere is deposited on the whole surface of the picture.

In conclusion: we may say that, with few exceptions, we have been able to intensify the weakest negatives to complete opacity with the lead intensifier described at the beginning, and only very seldom were we obliged to have recourse to the cadmium bath. This method—which is especially adapted to the reproduction of plans and drawings, and whose superiority over other methods we have demonstrated in the foregoing—is simple and sure to accomplish its purpose, and failure can only be ascribed to faulty washing or to the negative having been left an insufficient time in the bath.

Josef Maria Eder, *Chemist*, and Victor Tóth, *Captain*.

THE THREE PORTRAITS.

We—that is my little wife and I—always considered the Saturday afternoons our own to do what we liked with. We made no engagements, but left ourselves free as the wind to go wherever our fancy or humour dictated; and as often as not you might have found us amongst the narrow, unwholesome streets away down in the east end—the streets where brokers most do congregate. We went into these muddy waters on voyages of discovery; but I don't believe many fortunes are made on this track. One thing I know—we have never come across that dirty little picture for two-and-sixpence with the name on it which, when found, is worth ten thousand pounds.

We did not go down to find a fortune amongst the filth, but rather to enjoy a peer through the dirty, half-obscured windows at the strange conglomeration drawn together within. There you see an old file lying close beside a diamond ring. Suggestive of the housebreaker, is it not?—the tool he would most likely use, and the plunder he would like to lay his hands upon. See you that old, brown teapot in close companionship with that really valuable piece of old china, cracked and clamped—a meeting between the cottage and the mansion. Both of these had seen better days, but, by misfortune, they now meet on a level in the filthy atmosphere of the broker's window. See that real lace shawl, which may have decked the shoulders of some great actress, lying over that tawdry head-gear of the lover of drink. Wedding rings, like vows, thrown aside as useless. Lovers' trinkets also, and fathers' and mothers' gifts are lying here, which have been left by children in direst want, never to be redeemed. Watches and chains, knives and forks and spoons, all huddled together in this small republic. They all meet on an equality here, and who could look at them without feeling what pangs and pains it must have cost the owners of many of these to part with. Poor little trinkets! yet dear to them as their heart's blood. But man must live and they must go, and thus stern necessity grinds the little poetry out of their lives as want stands knocking at

the door; and so they part with them for bread, for bare life—a life not worth living.

On one of these rambles, and in one of the dirtiest of these windows, I came upon a leather case in which lay three brooches fitted with old photographic portraits. They lay quite loosely in the case, as if for convenience to keep them together, and not as if the case had been made for them. The pictures were useless except as specimens of the art in days gone by. Having a love for curiosities of this kind I took a fancy to them, and for a few shillings bought them, and that is how I became possessed of the three portraits.

"'There are stranger things in heaven and earth than are dreamt of in thy philosophy,' Mark."

This was said to me by Jack Grey, who for a whole hour had been labouring to convince me of the truth of second sight and clairvoyance, and no end of supernatural things (or clever tricks, I thought) which he had seen and experienced. Jack was rather annoyed at my evident unbelief, and hence the reason that he attacked my philosophy.

"You may close our argument so, Jack, if you like, but certainly it does not bring conviction with it. You say this young lady depicts scenes and relates conversations that took place long ago; but how can you tell that the whole thing is not a fabrication—a dream?"

"If it be within the knowledge of some present who could swear to the truth of the tale, what then?"

"Oh! Jack, you know well enough that when the nerves are strung to a high pitch, and the emotions have obliterated reason for the time being, you could make one believe red were black. In fortune-telling you must have observed how often it is asserted that the truth is spoken by the spae-wife; and why is this so? Simply because what she tells is so hazy and indefinite that the listener twists it into what exists or has existed; and so the dark man is so and so, and the fair man that other fellow. How wonderful that she should know! Now any fool would know the whole thing was a trick and the victim tricked."

"I'll tell you what, Mark," Jack replied, getting rather short in the temper, "there are a lot of people who make it their business to sit in judgment and condemn where, having no knowledge of the matter, prejudice and ignorance is allowed to do all the work. Look at the hundreds of people who, basking in the sunshine of their own ignorance, assert in their empty egotism that mesmeric power is a cheat and force of will a lie; and if you ask them quietly to give a little time to the investigation of the matter, they exclaim—'Do you take us for born fools? We know well enough.' And they hug their ignorance and injustice as if it were a treasure. Do you take your stand with them, Mark?"

"No, no, Jack; don't do me that injustice. I am quite open to come and investigate the matter whenever it is convenient for you."

"Now, Mark, that's spoken like a man. I will arrange a night and let you know. Remember this—if there be any deception in the matter I am myself deceived, and what reason could I have for playing such a senseless, useless trick upon a friend?"

"I know well enough, Jack, that you are in earnest. It would be one of those jokes when one would never know where the laugh came in. But I give you the credit of your conviction and honest purpose, old boy! and when you let me know I will come and see for myself. Good bye!"

And so we parted, I feeling convinced in my own mind that my friend was duped; whilst he set me down as a scoffer and an ignorant condemnor of a thing that I knew nothing of. But I resolved to give him the chance of enlightening me, and the time came.

On the night, and at the hour appointed, I entered the house where past mysteries were to be unfolded to me. Jack Grey waited my appearance, and as I entered the little parlour he welcomed me with great warmth, at the same time remarking—"All things look well for great manifestations to-night. I have just been to see Bella, and she is now in a trance. Did you bring anything with you that you would like to know the history of?"

I answered "Yes," at the same time producing the case of portraits I had bought at the broker's. A strange fancy had taken possession of me to know what might be said about them. I did not know whom the pictures represented; but if the lady told me how and where I bought them at starting (which I believed she could not), it would at least lend the charm of truth to the rest. Laying aside my coat and hat I came to the fire to warm my hands, the night being bitterly cold.

After a little Jack said, "If you are ready, follow me." He led me into another room, which was lighted by a solitary jet, making it look sombre, dull, and dark in the shadows. When my eyes got accustomed to the light I could perceive in the further corner a sofa, on which reclined his sister—a young girl. She looked pale and delicate, with a rich profusion of golden hair brushed back from her forehead, and falling in wavy splendour over her shoulders and down her back. Her eyes were open, yet she did not seem to have the sense of vision. She never moved them when we entered; they seemed vacant and unattracted by passing objects. Jack Grey noiselessly shut the door and motioned me to a seat. Jack seated himself at the head of the sofa, silence reigned for a moment, and during the silence a strange, nervous feeling took possession of me. At length Jack said in a low voice, "Now child, do you feel well?"

In a low, sweetly-musical voice the lady began—

"I feel my soul now free to wander forth,
To the east or west, to the south or north,
On the wings of the past I can fly away,
And catch up the time that was yesterday.
I can chase past years to eternity's shore,
Where division of time is known no more;
And from the tangled threads you give to me
I will untomb each long-dead history.
This—though you see and feel—you may deny,
Because you cannot tell the reason why;
But, go to the grave, tell those of long ago
Some of the things each schoolboy now doth know:
How sailless ships speed on, fearless and free,
Not waiting for the favouring gale, to sea,
But in the face of winds dash through the waves.
Why! the news would make them turn in their graves!
Tell how by touch electric news could send
Quick as thought to the world's furthest end.
Speak of the Iron Horse, who, day by day,
Hundreds of miles speeds on his endless way.
How we catch the sun's rays on their way to earth
And wed them to shadows, in which they give birth
To pictures of loved ones, of rivers, of trees,
Quick as your speech the producing of these.
'Away! we'll hear no more,' aloud they'd cry,
'You tell of juggler's tricks; 'tis all a lie!'
And this would not astonish you; the case is clear,
They could not comprehend the many changes here.
The laws existed then as now, but were unknown;
We the mystery solve, and claim them as our own.
And yet how like a lot of paltry puppets we—
Our tiny wires but reach as far as we can see.
The reasoner doth hold by nature's fixed laws;
We step beyond the line, he calls on us to pause.
Why should we? The land of spirits is our goal,
For in my oft communing I know 'tis soul with soul.
I ask the learned reasoners around their stilted throne,
Might this, Oh! great infallible! not be a law unknown?"

Here Jack's sister stayed as if waiting for a reply, and in the silence I felt very miserable. Were you ever at a party where the ice of conversation never got broken?—where the people rub their hands and twitch about on their chairs and smile a semi-imbecile smile till they have driven you half-mad? Or have you ever been at a Quaker's meeting-place, where all the people sit noiselessly still for half-an-hour or more, waiting till the "spirit move them," which it seems loath to do? Every minute becomes oppressively long. Your nervous system gets the better of your cooler self, your ears begin to ring, and you feel—"Oh! if I could just stand up and have a good yell I would feel ever so much better!" In the silence so felt I now; but the lady began again to speak and I felt better —rather startled though.

"You have brought with you," she said, in the same low-set, beautifully-modulated voice, "a small case of pictures which you wish to know something about. Place them on the table here, please."

I did so in silence, and sat down again. She laid her hand upon the case without once casting her eyes upon it. When her hand was so placed, she continued—"You bought this case from a man named Barker. You saw it exposed in his window for sale. It lay on the top of an Indian silk handkerchief, rich and varied in colour. You still remember it? Yes; I perceive you do."

I felt the blood rush up to the roots of my hair, but in silence I settled down into perfect wonderment.

"You love the art of which these three pictures are samples, and you bought them because they were, in your eyes, as a dream of the first days of the creeping childhood of the art, where, 'midst many failures, success was hailed with a cry of joy. Those who represented the faint outlines on the silvered plates enclosed have long since faded out of life. You would like to know some of the incidents in their varied lives. I will tell you." MARK OUTE.

(To be continued.)

NOTES FOR A SHORT TOUR IN BELGIUM WITH THE CAMERA.

[A communication to the Edinburgh Photographic Society.]

In coming before you this evening I must crave your indulgence for my shortcomings in not being able to impart any additional light on the varied technicalities of your beautiful art, as these are matters with which you are all more conversant than I, with my limited experience as an amateur worker, can possibly be; but I hope the few notes I have jotted down may afford some slight idea of what a rich field is open for the camera in Belgium.

In the first place, you have the quaint old houses, many of them picturesque in the highest degree, standing as they were three centuries ago. Then their town-halls and *palais de justice* are in the most florid style of Burgundian gothic, such as you meet with nowhere else. Their churches, which, although sometimes poor in outward appearance, and

so crowded by other buildings as to be almost hidden from view, are yet magnificent in their interiors from their lofty roofs and variety of outline, with their richly-carved and decorated pulpits, marble screens, choice pictures, and other adornments, some of which it would take long days of anxious work to do full justice to. Then there are their canals, teeming with fancifully-coloured vessels; and their markets, crowded in the mornings with peasantry in the quaint costume of bygone years, which they still rigidly adhere to, forming the most picturesque groups conceivable; and, further, lovers of art find a rich feast in their picture galleries, both public and private. With all these inducements you may calculate upon meeting with a kind and hospitable people, and find you can live at a moderate cost. The towns are so short a distance apart and of such easy access that, taking it all in all, I know of no other part of the continent where you could find so much and so varied material of the particular class I have named, and all within a twenty-four hours' journey from Edinburgh.

You will observe that I have said nothing of their landscape scenery, because much of the country in Belgium is very flat and tame until you get into Luxembourg, where, in the country around Namur and on to Treves, you find scenery that will compare even with that of our own beautiful land. I propose, therefore, to confine myself to a few of the towns only, as being quite sufficient for one summer's holiday; but it is likely that, when you have once seen these, you may at another time extend your journey, by Liege and Aix-la-Chapelle, to Cologne, and from thence into the north of Germany, where you will find another wide field for your operations.

It is, however, a curious fact that, rich as these parts are in subjects for the camera, there has been little done by the local photographers to illustrate them, and it is very difficult to get good prints at all worthy of the subjects. Last August I met an artist from Brussels at work in Ghent, who told me that he was making a series of views of the churches, and promised to have some prints ready for me if I would call on him at Brussels; but he did not keep his word, and when I wrote to a friend afterwards to call for them he found him gone. Besides the views of the churches he had been selling some indecent prints, which brought the police "down" upon him, and he was obliged to make a hurried escape.

With these and the following preliminary remarks I shall ask you to prepare to accompany me in my journey, and would suggest that along with your rapid rectilinear or doublet lenses you also take a wide-angled rectilinear lens, as many of the most picturesque objects are in narrow streets and confined places, where the ordinary lenses would be of no service. Also, that all your apparatus should be put up in small, handy cases, and properly labelled, quite independent of your other luggage, and never allow these to go out of your own keeping, as the registered luggage (which it must all be on the continent) often receives very rough usage.

If you intend to work with dry plates have several thicknesses of orange-coloured calico between them and the lid of the plate-box, in case you should be asked by the custom-house officials to open it. I have never been required to do so, as I label my plate-box, in prominent letters—"*Cliché photographie.*" "*Ne pas ouvert au jour.*" On exhibiting this, when accompanied by the tripod-stand and other requisite *impedimenta,* they are satisfied. Last, but not least, have your money in gold or Bank of England notes, which are received all through Belgium.

Presuming, then, that you have everything in readiness, and time being always an object, my method is to leave by the limited mail at 5.55 p.m., reaching London about 4.30 next morning. I go direct to Charing-cross Hotel, where I can take two hours' rest on the sofa, wash, and have breakfast, by which time the office is open, register my heavy luggage, procure the morning papers, and secure my seat. At 7.40 a.m. the train leaves for Dover, and in two hours I am on board the Ostend steamer in Dover harbour. Looking out for a seat on the lee side of the vessel, and placing some of my "traps" there to show it is taken, I stow the rest in the saloon below, where I can easily find them afterwards when ready to land.

In leaving the harbour a magnificent view is visible of the lofty chalk cliffs and castle, which, I have no doubt, must be familiar to you all from Turner's well-known engraving. As this recedes from view the vessels constantly passing up and down the Channel next engage your attention for a time; but, tiring of these, you seek relief in the perusal of *The Times* and other journals. So time passes on, and the sharp sea air makes one feel ready for a luncheon, which the steward, who is always ready for emergencies, soon provides. A sharp look out is kept to starboard for the Light Ship, as we know from it that our voyage is half over; and now, the French coast being well in view, the time seems to pass more rapidly. The lighthouse tower on the quay at Ostend becomes nearer and nearer; and the vessel at last is running up alongside the jetty at the entrance to the harbour. You will then see many an English face eagerly scanning the deck for expected friends, and saluting them as they pass with welcome gestures.

The boat being moored, the *douaniers,* with their chief in his gold-laced cap, immediately come on board, when *Messieurs les Voyageurs* are informed that the baggage for Belgium will be examined before leaving the vessel; and, the registered luggage being laid out on deck, every one opens his own, which, being examined, is left in the care of the officials. Your other luggage being examined in like manner, and chalked with a white cross, you are permitted to leave the vessel. The train standing on the quay in readiness, you place your luggage on your seat in care of the *conducteur,* and, as there will be nearly an hour to wait, you may cross the quay and have dinner at the "*buffet,*" or take a stroll in the town, where there is very little interesting to be seen. At three o'clock the train leaves, and in about thirty minutes it reaches Bruges. The far-famed Belfroi, with the spires of the churches, come prominently into view, and as this will be our first resting-place we shall deliver up our receipts and receive our registered luggage. In ten minutes more we are safely lodged in the comfortable old Hotel de Flandre. JOHN LESSELS.

(To be continued.)

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
March 6	West Riding of Yorkshire......	Victoria Hotel, Bradford.
" 9	South London	John-street, Adelphi.
" 9	Manchester....................	Memorial Hall, Albert-square.

BERLIN PHOTOGRAPHIC SOCIETY.

AT a recent meeting of this Society the Vice-President (Herr Prümm) took the chair, as Dr. Vogel, having succumbed to an attack of Nicobar Island fever, was unable to be present.

After the transaction of some local business, and the examination of interesting objects laid on the table, the attention of the meeting was directed to the question for the purpose of considering which it was called, viz., the reply received from the police to the application of the Society for permission to establish a Widows' and Orphans' Fund, subject to certain rules which accompanied the application. The reply in question was to the effect that the rules could not be sanctioned in their present form, and recommended that they be altered so as to be more like the rules of the Berlin Sick and Burial Society. The meeting feared that the rules would require to be altered; but, before making any change in them, it was resolved to send two of their number, as a deputation, to represent to the authorities that the projected fund was on quite a different basis from that of which they were desired to copy the rules. [This is a sample of paternal government with a vengeance! Imagine the feelings of an English photographic society who had to apply to the police for permission to form a superannuation fund, and being refused that permission because their rules differed from that of some other society with which they had not the slightest connection!]

The question-box was then opened, and the following question found in it:—"What is the reason that a process which has been successfully worked for years suddenly produces negatives which are so intense and opaque that they can scarcely be used, and require to be treated with cyanide of potassium to make them more transparent?" The question was accompanied by a description of the process, which was quite an ordinary one.

Herr PRÜMM thought the cause was likely to be found in the silver, which varies very much in quality. If this were the case it could easily be ascertained by using the silver for strengthening. With one and the same iron the intensifying fluid sometimes remains clear a long time after the addition of the silver, while with different silver a thick deposit is thrown down, without any impurity of the silver being detected by chemical analysis. Such silver generally gives a coarse texture, and might easily cause the fault complained of.

Herr SCHAARWÄCHTER advised that such a silver bath be strongly acidified.

Herr REICHARD was of the same opinion. He had often found it necessary to add fifteen drops of nitric acid to each pound of silver nitrate in new silver baths.

Herr QUIDDE remarked that he had often added even a greater quantity of acid without observing that any bad effects resulted; nor did he share the opinion of some that the exposure was lengthened by acid in the silver bath.

Herren REICHARD and SCHAARWÄCHTER observed that the acid even acted as an accelerator rather than as a retarder. The latter recommended an acidification with nitric and acetic acids, and advised the inquirer to expose the pictures longer, and to develope them with weak iron developer.

Herr ROLOFF had cured a silver bath of the same fault by boiling.

Herr HABERLAND had for the last two years neutralised every new silver bath with carbonate of soda and then acidified it again with nitric acid.

Herr PRÜMM did not think very well of this proceeding, as a nitrate of soda would be formed.

The discussion was continued by two more speakers; but no new light was thrown on the matter, the inquirer being merely warned against the impurities sometimes contained in the fused nitrate of silver sold as lunar caustic, and also against impure iron.

Correspondence.

CONVERSION OF HALOGENS.

To the Editors.

Gentlemen,—Mr. Berkeley has very properly pointed out that I mistook his original statement, for, on referring to his letter, I find it was the precipitate, and not the solution, that became of a more pronounced colour. It is difficult to diagnose changes of colour by description alone without knowing particulars of quantity, purity, or impurity of chemicals, &c., &c.; but, so far as his clear description allows me to judge, I should think it very likely that his bromide of silver contained iodide also, and from his last letter there is every probability that such is the case. The result would be precipitation of iodine in a minute state of division, the effect of which would be a discolouration of the precipitate, somewhat similar to that he describes. Let him try the experiment I suggested, employing, instead of ether, bisulphide of carbon when the supernatant liquid is of not too dark a colour. Then if, as I suspect, iodine be present the bisulphide will take it all up, and assume a more or less deep violet colour. He might also purposely introduce with the bromide a small proportion of iodide, and observe whether he gets increased depth of colour.

The re-absorption of the bromine which Mr. Berkeley asks about is caused by the formation of chloride of bromine, which would be certain to occur upon adding more chlorine when the bromide was all reduced.—I am, yours, &c., G. Watmough Webster, F.C.S.

February 29, 1876.

CARBON PRINTING.

To the Editors.

Gentlemen,—I observe a recommendation in your Almanac to prepare carbon tissue having a superficial film of a cooler colour than the body of the pigment, so that the print produced should have the lighter half-tones less warm than the shadows. The fact is that the mere attenuation of the film to form these lighter tones does in itself cause it to appear very considerably cooler in tone than the shadow.

I submit to you a print made with the autotype brown tissue, the margin of which, being lightly printed, is of a cool grey, while the shadows are of the well-known deep, warm tint. The difference of tone, of course, pervades the whole print; but the plain light margin shows it unmistakably. The desired variety of colour which is seen in the print I submit may possibly be not owing altogether to the cooler effect of a thin film, but also, in part, to the warmer colour dissolving more readily from these slenderly-covered portions of the picture.

There is one point, however, in which there is room for improvement in the manufacture of carbon tissue. I find that with very dense negatives the tissue gives a result better, perhaps, than with silver printing; but with negatives of the usual intensity, such as give the finest effects with silver printing, the carbon print is rather wanting in strength and richness. I do not think that this result is owing to any specially thin character of my own negatives, as I have heard the same complaint from other quarters. If the Autotype Company, however, are of the opinion that their tissue is of the right intensity for *ordinary* negatives—although I believe this idea to be a mistaken one—they might still accommodate photographers by supplying another tissue of a strength suitable for *thinner* negatives.

If it be objected to add one more to the numerous varieties they already supply, I would venture to suggest that this one new variety would be of much more service than so many existing varieties of one intensity. For my own part I could be content with the colour of any of the six or seven photographic coloured tissues they supply, or with a colour compounded from the whole, rather than be tied down to the production of an intense negative.—I am, yours, &c.,

Ryde, I. W., February 28, 1876. W. E. Debenham.

EMULSION EXPERIMENTS.

To the Editors.

Gentlemen,—As I have already troubled you with an account of my failures with the chloriodo-bromide process, I think you should be made aware of the cause that led to the same; otherwise what I have already written would only serve to take up space in your valuable journal.

I have now no doubt that, what is so often the case, the pyroxyline was unsuitable or that the collodion was too new. I have been led to this conclusion by two facts:—First, that the addition of the plain collodion to the emulsion, as recommended by Mr. M. Carey Lea, makes the latter much slower; and, secondly, that the addition of glycocine makes the emulsion as sensitive, or nearly so, as the trial plate made before pouring the former out to set. The emulsion is much addicted to peeling from the glass on drying; in fact, the film seems to be neither "powdery" or "horny," but brittle. This latter quality is not caused by want of pyroxyline, as that addition makes matters worse. Here we again have a case of a pyroxyline being fairly suitable for an ordinary emulsion, as proved by the trial plate, but not for a washed one. The pyroxyline was made by Mr. J. W. Gough's gelatine formula; and I can only suppose that I was not successful or that the collodion was too new.

I have said that I do not find that rectified alcohol has any advantage over methylated treated with silver nitrate. I have lately dissolved some pellicle in both kinds of alcohol, except that the methylated was a commercial sample, sp. gr. ·823, and not doctored in any way. The best absolute methylated ether was used with both emulsions. I can perceive no difference in the results, though neither plate was exposed the full time. If "methylated" *will* answer as well why use the more costly "rectified?" I am not sure whether it is well to use the methylated spirit for making the emulsion with *free silver nitrate*, but I have proved that no precipitate is thrown down, provided the bottle be kept in the dark and the contents not heated (this latter would produce the same effect as light if the spirit be heated to boiling point). It is difficult to see how any harm could ensue from its use, as everything soluble is washed out of the pellicle. However, Mr. Stillman, in your Almanac for 1874, says, regarding an ordinary emulsion:—"Methylated alcohol I found to affect sensitiveness very materially. Rouch's pyroxyline dissolved in methylated and pure spirits gave, in the latter case, a film three times as sensitive as in the former." Can anyone else give their experience in this matter?

In the last paragraph but one of my last letter, the printer has made me say two things I would rather not. For "any," *read* "my;" for "I made ninety-nine grains," *read* "ninety-one."

I am glad to see that Major Dennie and "L. S. D." have been successful with two pet crotchets of mine. I can assure Major Dennie that Mr. Kennett would as soon think of keeping his emulsion for six months as of using alcohol in the developer! As to the essence of cloves, it is highly probable that that would be better than my decoction. I believe that the cloves act by forming a kind of superstratum of vapour over the gelatine, engaging the oxygen of the air.

I see that Captain Abney takes, apparently, Mr. W. Robinson's view of the affinity of the halogens for silver. However, according to Mr. G. W. Webster, hyriodic acid will displace chlorine from silver, as, also, will a soluble iodide. Now in Captain Abney's case, when the converse of this happens, the effect is brought about by a halogen in the *free state*, and therefore, as I understand it, it should have a more energetic action than when in combination with a base. Will a soluble bromide displace iodine in the same way as a soluble iodide displaces bromine? The answer to this is, doubtless, "no." Can Captain Abney explain why chloride of silver is so much more slowly formed than iodide, if chlorine *has* a greater affinity for silver?

I find that the "cream-coloured" compound, mentioned in my last letter, still contains bromine. I had thought, on putting the tube and its contents away, that all was removed as the liquid ceased to colour; this, however, is not the case, prolonged action ejecting more bromine.

Mr. L. Warnerke's experiments with the different bromides encourage me to try the same experiment with the chlorides. This I have been intending to do since reading Mr. H. J. Newton's paper, and I suggested such in a letter to you about that time.

Will Mr. M. Carey Lea inform me whether he has tried iodide in connection with bromide of silver in a gelatine emulsion? It was his intention to do so when he published the process. I tried the addition once, and the result was the reverse of encouraging; but I do not consider the experiment conclusive. It will not be possible to use free silver nitrate even if free acid were employed, as that would alter the character of the gelatine. However, I believe Mr. Lea considers that increased sensitiveness is obtained by the *iodo-bromide of silver;* therefore a gelatine emulsion, made with a proper proportion of iodide, should be more sensitive than a plain bromide one. If a gelatine emulsion be not more sensitive under these conditions, that fact would point to the theories that either the iodo-bromide reacts in a peculiar way on the pyroxyline, which it does not on the gelatine, or that iodo-bromide is more sensitive when produced with free silver nitrate. The effect produced by free nitrate on the pyroxyline seems to be out of court, seeing that free nitrate is not required to make a gelatino-*bromide* plate exceedingly sensitive.

I should much like to know in what relation as to sensitiveness Mr. Kennett's and Mr. Lea's plates would stand as prepared respectively by themselves. Could not the Editors procure sufficient pellicle from both gentlemen to coat a few plates, with a view of elucidating this point?—I am, yours, &c., Herbert B. Berkeley.

Cotheridge Court, Worcester, February 28, 1875.

Serious Explosion in a Street.—A terrific explosion took place on Monday afternoon last in Grey-street, Newcastle-on-Tyne, close to the Branch Bank of England and Messrs. Reid and Son's, silversmiths. The private door of the bank was blown in and several of the windows, while the plate-glass windows of the silversmiths' shop were destroyed. The upper part and the dial of a magnetic apparatus were blown out, and the windows of the adjoining premises and those on the opposite side of the street were likewise broken. At first it was supposed that it was due to some electric discharge from the clock and the explosion of an accumulation of ordinary gas; but it was subsequently discovered that a youth, who had been picked up in the street with his hands and face injured, and taken into a chemist's shop, had been carrying a bag containing the oxygen and hydrogen gas used in producing lime-light. He was on his way from the new Tyne Concert Hall to get it filled at Messrs. Mawson and Swan's, when, in putting it on the ground, it exploded. The cause of the explosion is a mystery, as concussion will not explode these gases.

EXCHANGE COLUMN.

I will exchange a Voigtlander card lens for a Weston burnisher.—Address, B. G., London School of Photography, 103, Newgate-street, London, E.C.

Wanted to exchange, a large-sized background (marine view). for *carte* camera with double dark slide, or a *carte* rolling press.—Address, NICHOLS, Photographer, Canterbury.

Spanish mahogany whole-plate camera, with single and double dark slides, and 12 × 10 view lens, in exchange for a postage-stamp camera and lenses, or magic lantern.—Address, T. J. LLOYD, Hale's-street, Coventry.

Will be exchanged, a bellows-body *carte* camera, with *carte* lens; Murray and Heath's tent with accesssories, and a box of twenty-four cutting shapes. for tourist's bellows camera (Meagher's preferred), lens and portable bath.—Address, W., 57, Grainger-street, Newcastle-on-Tyne.

ANSWERS TO CORRESPONDENTS.

PHOTOGRAPHS REGISTERED—

G. W. Webster, Chester.—*Four Portraits of the Marquis of Ormonde.*

Mrs. Corrigan, Manchester.—*Four Views of the Interior of St. Paul's Church, Manchester.*

B. Lowe, Ilkley.—*Two Portraits of the Bishop of Lincoln, and two of H. D. Robinson, of Skipton.*

☞ *Correspondents should never write on both sides of the paper.*

GEO. R. FOX.—For sensitising, let the bath be made of glass; for fixing, either wood or gutta-percha will answer quite well.

GEO. HOOPER inquires if any correspondent can inform him what it was that made Pouncy's bitumen of Judea withstand the action of turpentine where exposed to light.

WHOLE PLATE.—Both lenses being constructed on similar principles, the one best adapted for your special requirement is that which has a focus suitable for your camera.

JOHN D. HODSON.—The transfer ink you used is the wrong kind. You will succeed much better by making use of lithographic printing ink diluted to the necessary degree of consistency.

JUNIUS.—Not having a price list to refer to we cannot say what is the cost of the lens when new. It will cover about six inches very well, judging from a nearly similar one in our possession.

R. A. P.—The finest quality of cement for the joints of the dish is composed of twenty grains of india-rubber dissolved in two ounces of chloroform, to which is added half-an-ounce of powdered mastic.

T. O. M.—It would certainly have been easier for you to have tried the experiment, and thus to have ascertained the matter for yourself, than to have written asking us to do it. To your second question—yes.

J. T. (Fochabers).—We are unable at present to add to the information already given upon this subject. Organic pyroxyline will soon become a regular article of commerce, provided the manufacturers of pyroxyline find a sufficient demand for it.

ANVERSOIS.—As the query stands we do not quite understand it. Assuming that you wish to know whether there is any dry collodion process negatives by which can be developed by iron, we reply—yes; but silver must be added to the developer.

S. BROWN.—Such a lens as that you describe has never been brought under our notice. We have grave doubts as to whether it would enable a very oblique pencil to be brought to any focus at all, for the aberrations must be something extraordinary.

MICROS.—A microscopic object-glass of two-thirds of an inch in focus will easily show the markings in *P. Formosum* provided it be an objective of large angular aperture. A two-thirds of medium quality and small angle will *not* resolve this object, no matter how perfect is the adjustment of the light.

HUGH MURDOCH.—The whites of the print are certainly very satisfactory, but the tones of the blacks are not so good. The tissue made use of in this case appears not to have been intended for portraits, being of the kind adapted for imitating engravings of a warm black. The keeping qualities have been most satisfactory.

W. N. M.—The paper upon which our ALMANAC illustration is printed was specially prepared by the firm by whom the picture was printed. We are not aware whether it can be purchased ready prepared. An inquiry among the dealers in lithographic appliances would probably ensure your receiving all the desired information.

TYRO (Manchester)—alluding to a remark by a correspondent who gave a "Kennett" plate an exposure of half-a-minute to the light of a paraffine lamp—thinks there must have been some mistake, as he finds half-a-*second* a sufficient exposure when the plate is held at a distance of six inches from a paraffine lamp, behind a clear negative.

BRIXTONIAN.—We shall be glad to hear what success you have had with the oxymel process. It was at one time—several years ago—a great favourite with many photographers, and we know that numerous pictures of great excellence were produced by it; but, somehow or other, it has of late years been lost sight of altogether, its alleged slowness being the chief objection. Do not use the oxymel of too great a strength, but dilute it with at least an equal volume of water.

GEORGE WOODWARD.—While it is quite true that the red colour may be removed from the old collodion, it is not equally true that such collodion is thereby rendered "quite as good as new." As a rule, very old collodion is altogether worthless—of no use even to recover the solvents by distillation. It is true that it is utilised by many for cleaning plates; but even for this purpose it is inferior to other agents, while it seriously affects the eyes of those by whom it is so used.

ARCHIE.—Immerse the calico for the tent cover in a solution of acetate of lead, afterwards treating it in a similar way in a solution of bichromate of potash.

W. B. S.—To ascertain the density of the kinds of glass in the lens remove the latter from its cell, and place it in water sufficiently warm to melt the balsam by which the two elements of which it is composed are united. Then clean the surface by means of ether or benzole, and ascertain their specific gravity by weighing each separately, first in air, and then in water. Until glass of a similar description has been obtained you need not indulge in the hope of making an effective use of the curves in your possession.

PORTUGAL.—A remedy for the decomposition of solutions of citric and tartaric acids is found in the simple operation of heating them to boiling point, and then allowing them to cool. This treatment appears to destroy the vitality of organic germs, which otherwise would quickly induce decomposition. We do not, however, assert that boiling will prevent fungoid growth for an indefinite period; but we do know that it materially lengthens the time such solutions will keep good. Sulphite of soda added in small proportions to a solution of citric acid will also act as an excellent preservative for the solution.

B. J. EDWARDS AND CO.—This firm write as follows:—"Among the replies to correspondents in your issue of the 25th inst. we observe the following:—'We have not seen any examples of phototint except that in Tissandier's work, and that seemed to us to be printed by the lichtdruck process.' This appears to us to require some explanation; as the paragraph stands it is calculated to create a prejudice in the minds of your readers. We shall be pleased at any time to submit other examples of our work to your notice."—We are not a little at a loss to ascertain in what direction our reply requires "explanation." It consists of a statement of a fact and a surmise as to the generic process by which a certain print was produced. If we are mistaken in our surmise, and if our correspondents state that it has *not* been produced by a "lichtdruck" or collotype process—which, by the way, they have not done—we shall accept the information as a negative addition to our knowledge. In what respect "prejudice" is calculated to be created by our misfortune in not having seen a plurality of specimens of phototint, and in our supposition that a certain print "seemed" to have been printed by a specified process, we hazard no conjecture. We shall, however, be glad to see other examples of phototint.

RECEIVED.—*York's Lantern Readings; Hand and Heart;* Henry Williams; T. J. Lloyd; L. S. Parkes (provisional protection only); T. Baxter; Lindsay Howie; G. H. H., and others. In our next.

☞ Editorial Communications should be addressed to "THE EDITORS"—Advertisements and Business Letters to "THE PUBLISHER"—at the Offices, 2, York-Street, Covent Garden, London, W.C.

SOUTH LONDON PHOTOGRAPHIC SOCIETY.—At the forthcoming meeting of this Society, to be held on Thursday, the 9th instant, in the House of the Society of Arts, Adelphi, Mr. W. T. Wilkinson will read a paper *On the Difference Between Collodion and Carbon Transparencies.*

"THE BOOK OF THE DEAD."—The *Athenæum* mentions that the authorities of Trinity College, Dublin, have undertaken to assist the publication of the *Book of the Dead* by photographing the fine papyrus of this text, which is preserved in the library of the College. It appears that the authorities of the British Museum have also associated themselves with this international undertaking by ordering the preparation of photographs of the finest and largest funerary papyri which are ascribed to Theban dynasties; while the Prussian Government has most liberally voted a sum of 4,800 thalers towards the cost. The Academy of Berlin has undertaken to defray the preliminary expenses.

METEOROLOGICAL REPORT,

For two Weeks ending March 1, 1876.

Observations taken at 406, Strand, by J. H. STEWARD, Optician.

THESE OBSERVATIONS ARE TAKEN AT 8.30 A.M.

Feb.	Bar.	Wind.	Wet Bulb.	Dry Bulb.	Max. Tem.	Min. Tem.	Remarks
17	29·70	W	51	52	55	47	Dull
18	29·57	SW	46	51	60	48	Cloudy
19	29·34	W	44	46	56	44	Cloudy
21	29·83	W	50	52	55	41	Dull
22	29·86	W	48	50	56	46	Cloudy
23	29·69	W	45	47	—	44	Cloudy
24	30·07	W	35	39	48	34	Bright
25	29·94	SE	38	40	48	37	Raining
26	29·56	W	45	47	54	39	Cloudy
28	29·80	W	46	47	57	42	Raining
29	29·79	W	50	52	59	46	Raining
March. 1	29·51	SW	50	50	50	47	Raining

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THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 827. Vol. XXIII.—MARCH 10, 1876.

A DAY WITH A PHOTO-ENAMELLER.

When we state that we have at last been made acquainted with the details of the enamelling process by which Mr. A. L. Henderson has acquired such justly-deserved fame, many of our readers will rightly think that we are to be envied. Nor will this feeling be in any way diminished when we add that not only have we obtained from Mr. Henderson the knowledge of the principles upon which his process is founded, and the formulæ based on such principles, but have been present in his *atelier* when he was engaged in the production of these charming and permanent photographs, and have seen the whole of the operations performed from beginning to end. There lies before us at present a singularly-fine specimen, the *cliché* of which was made, the various processes effected to which it was requisite it should be submitted, and the burning-in and mounting all completed under our observation. When to all this we add that we have the fullest permission to publish the process we have said sufficient by way of exordium.

There are two methods by which enamels may be produced. One is by means of a mixture for coating the plate, which mixture, when spread upon the surface, will become hygroscopic or remain hard in proportion to the amount of light allowed to fall upon it through the negative; the other is by the use of a film containing a black or dark oxide or other pigment, which becomes embedded in the glazed surface of a white tablet on the application of heat. Both of these methods are associated with the name of M. Lafon de Camarsac, who was the first to render this department of our art-science practicable. Since he published the outline of his processes in *Comptes Rendus*, in June, 1855, many improvements in the details have been effected.

It is the second of these methods that has been selected by Mr. Henderson as the groundwork of his process. M. Lafon de Camarsac started with a transparency which was so much overdone as to have all the half-tints quite buried when seen by reflected light; this image was then treated with salts of gold, tin, or chromium, which were fixed either by the fusion of the surface of the enamel or by the application of a thin flux, which upon fusion spread in a thin, glassy covering over the image. This method was subsequently elaborated by M. Grüne, who, in 1866, patented a process based upon that of Camarsac, and of which the following is an outline:—The collodion image, which is made very strong, is toned with the chlorides of gold, platinum, iridium, palladium, or other metals; the film containing the image is then applied to the surface upon which it is to be burnt, after which it receives a coating of "glassy flux" by painting the picture film with a suitable aqueous solution of metallic salts, the picture being then ready for the burning-in process. It is said that Herr Grüne was himself able to produce good pictures by the method described, but, except two in metallic gold, we have never seen any; and, if we mistake not, those who tried to produce photo-enamels by means of his patent found it necessary to introduce serious modifications before presentable pictures could be obtained.

Notwithstanding the changes that were rung upon this substitutionary method of producing enamels, it was surrounded by so much that was tantalising and uncertain, and the *good* results secured by its means were so very few and far between, that most of those who were stimulated into an active pursuit of the beautiful phantom gave up the chase in disgust. When Mr. Henderson entered the field of enamel research it was soon evident that he had discovered some method of producing these beautiful pictures quite different to that formerly known or publicly practised, for there was a clean, crisp, and delicate yet bold appearance about his productions which had never been seen previously; and, writing this as we do in full possession of the details of his process, we can certainly affirm it to be unlike any that has been known hitherto. Although full details cannot at present be given on account of a patent being, during the present week, obtained for the invention—which protection may not have been effected before the publication of this number—we are still at liberty to state a few particulars respecting the production of the beautiful picture which was produced in our presence.

The picture, which was eventually burnt-in, had its inception in a collodion or silver image obtained by a camera from the *cliché* furnished for the purpose, and which may be either a negative or a transparent positive. This power of using either a transparency or a negative is a useful one; from what we saw, however, we concluded that the more satisfactory results were obtainable from a negative. This reminds us that, several years ago, when describing a visit we had paid to the establishment of M. Silvy (who at that time acted as agent for M. Camarsac), the advantages of sending not negatives, but *transparencies*, were strongly urged, and we devoted an article to the best methods of their production. In the present case our recommendation would be of quite an opposite character.

In the course of Mr. Henderson's demonstration of his process we saw a great variety of useful "dodges," some of which we shall explain as we proceed.

The collodion transparency was very thin, in this respect altogether unlike those made use of by Camarsac or Grüne. When the picture is too strong its intensity is reduced by a solvent acting on the following principle:—The image, being composed of metallic silver in a very fine state of division, is soluble, of course, in various menstrua—nitric acid, for instance—but the application of any of these to the surface of the plate would immediately effect the removal of the delicate portions of the picture so desirable to be retained, and cause the image to become hard and patchy. Previous, therefore, to the application of the solvent, Mr. Henderson first of all protected from its action those thin, delicate portions, by rinsing the picture quickly in a solution which acted upon it in the inverse order of its density, converting the silver in the feeble portions into a substance unacted upon by the solvent, which was thus left free to act upon the denser portions only. Complex though this double action may at first appear to be, the time occupied in the whole operation, including the washing, scarcely exceeded half-a-minute.

The solution to which the picture is next transferred differs, we have said, from any hitherto employed. Its action is multifold, but we are safe enough in designating it a "*depositing*" solution. After its action has terminated the image remains as a metallic oxide, combined with a flux which is formed in the course of the depositing operation. The finest effects are obtained when the deposition is not too rapid. In connection with this part of the operation we were

led to admire the simplicity of the means employed to keep the fluid in the depositing baths in a state of gentle agitation. A square board of about three superficial feet was suspended by the corners by four wires, the upper ends of which were gathered in a loop and suspended from an ordinary kitchen roasting-jack. The small suspended table was then loaded with trays containing the solutions, being piled one on top of the other, and the jack being set in motion the contents were kept in a state of gentle agitation by the alternating revolutions of the table.

The operation of vitrification or burning-in occupied a very brief period—say about a minute. A small gas furnace was employed, the muffle being, however, of dimensions sufficient to admit with facility an enamel as large as a man's hand. The furnace was heated by ten Bunsen burners placed side by side in two rows, the upper ends of which were projected into the bottom of a cylinder formed by fire-clay, which constituted the furnace, and having a hole (closed by a door) in one side, in which the muffle was placed. This gas furnace appeared to be exceedingly convenient for the purpose; for the time required to get up a proper degree of heat, after lighting the gas, is very short. It is also very free from dust or such messes so frequently associated with coke furnaces; besides which, the gas can be immediately turned out on the completion of the operation. But when the number of enamels to be burnt-in is very great Mr. Henderson prefers to employ a coke furnace of large dimensions built-in in the same room in which the gas furnace is erected, and charged with fuel ready for lighting at a moment's notice. As accessories to this furnace were a number of muffles of large dimensions, each of which might easily afford space for a dozen enamels of the usual form and size.

We have stated that the burning-in of the enamel now before us occupied about a minute, but we can easily realise the truth of Mr. Henderson's statement, namely, that when the large furnace is brought into requisition and has attained its full degree of temperature, less than half-a-minute will suffice to vitrify a well-prepared picture. A sharp and short "heat" is preferred to a slow and prolonged one.

It is well known that enamel powder colours consist of a metallic oxide ground up intimately with a finely-powdered and fusible glass, the latter giving the body and glaze, while the former imparts the colour. The best description that we can give of Mr. Henderson's process is by saying that he deposits upon the primary silver image of a negative or transparency a substance precisely similar to this powder, by which a brilliant image is obtained, no after-fluxing being at all necessary. The rapidity with which finished enamels may be turned out is such that, given an ample supply of negatives and an hour and a-half for preparation, finished enamels of medium dimensions may be turned out at the rate of one every five minutes, smaller sizes occupying a much shorter period. As we timed the operations we are enabled to speak with confidence upon this point.

In connection with the method of producing enamels of which we have spoken we saw an ingenious process of photographic engraving based upon the vitrification of the enamels. A smooth surface, either of porcelain or enamel, was selected, and a picture was etched into it, with every detail so perfectly rendered that a magnifying glass was requisite for its examination. This engraving can either be used for printing purposes, *a la* copperplate, or in the production of metallic surfaces for similar purposes; but it is probable that the most useful application of the process will be found in the power it confers of filling up the hollows, by means of enamel powders of various colours, as in niello-work, and then subjecting them to vitrification.

The method adopted for vignetting the pictures intended for vitrification is highly effective. Assuming that the glass negative or transparency to be copied is placed against a window pane, an opaque mask with a suitable aperture is attached to a pendulum, which is made to oscillate in the line of the axis of the lens of the copying camera, and, as the slightest change of position of the mask causes an alteration in the size of the image of the aperture, it follows that, by the motion of the pendulum, the vignetting of the picture in the camera is effected in a very perfect manner.

We are glad to learn that it is Mr. Henderson's intention to grant licenses for, and to teach, this process of enamelling. We need scarcely observe that the method of tuition by demonstration is much superior to that of reading; and this seems to us to be one of those photographic processes a better knowledge of which can be acquired by a single lesson than by much study and experiment, even with the most carefully-compiled formulæ. It is our intention to recur to this subject as soon as we are permitted to do so by the exigencies of the patent law.

ON THE IMPORTANCE OF A REGULAR SUPPLY OF DRY AIR AT ANY REQUIRED TEMPERATURE.

Photographers—especially those who are given to experimental work—know well how much their success depends on the facilities given to their operations by the numerous "dodges" and "wrinkles"—to the importance of the adaption of trifling means to the securing of important ends; and, therefore, we have much pleasure in directing the attention of our readers to a piece of apparatus described by the Rev. J. H. Palmer in a paper read before the Edinburgh Photographic Society, and which appears on another page.

We suppose all dry-plate workers know how much depends on the rapid and uniform drying of their plates. Some time ago we made a series of experiments with a view of ascertaining the difference in sensitiveness and other desirable qualities existing in plates which had been dried at various temperatures, and were surprised to find that those dried at a constant temperature of between 150° and 200° Fahr. were not only more even and free from irregularities, but also considerably more sensitive, than those dried spontaneously. That there should be a difference is quite natural, from the fact that a microscopical observation shows unmistakably that between the two there is a decided difference in the mechanical structure of the silver iodide and bromide—that of spontaneously-dried plates being larger in the grain and not nearly so glossy on the surface.

The necessity for some tolerably rapid and uniform means of drying the plates has long been recognised, and many drying-boxes have been from time to time described and illustrated in our columns. A favourite method of our own, which we have had in use with considerable satisfaction for many years, is the following:—In our operating room is a stove invented by Dr. Stark, and described before the Royal Society of Arts in 1855. It consists of a circular fire-box of cast iron, surrounded by a body of sheet iron rising some four feet above the fire and three feet above the flue. Between the fire-box and sheet-iron cover there is all round a space of about a quarter of an inch, through which is admitted a constant current of air. This is rapidly heated by the fire, and accumulates in the large space above, heating the sheet-iron casing and giving a large radiating surface. On the top of this stove, which is of flat sheet iron, we laid a few sheets of blotting-paper, on which the plate was placed, face up, and at a temperature about as hot as the hand could bear. Each plate was dry by the time its successor was ready to take its place. An examination of our note-book shows that during the whole time we used this method we were more evenly successful in the preparation of large batches of plates than we had been either before or since, and we think we are thereby entitled to infer that the rapid and uniform system of drying is of considerable value, when good work, and not mere experiment, is aimed at.

The little piece of apparatus described by Mr. Palmer—the idea of which he ascribes to Mr. Kennett—seems to us to be as nearly perfect as may be described, especially when it is combined with the drying-box which he uses, as the temperature may be regulated to a nicety, and perfect protection is obtained from the injurious action of unconsumable gases—a source of failure frequently experienced in boxes where the heat is obtained from gas burned inside. Satisfactory as the cone and spirit-lamp arrangement undoubtedly is we think there is room for a little improvement. Instead of the spirit lamp a small Bunsen burner might be used, and inside the box there should be arranged a tube containing a column of air. This should be connected with a U-tube containing mercury, which would be pressed upon by any expansion of the air as it became heated. In

this way the mercury depressed in one leg of the tube would rise in the other, and so could readily be made to shut off or supply the required quantity of gas to keep the interior of the box at the temperature desired. Such a regulator has been recently introduced, and were it applied in the manner suggested we are sure the arrangement would be all that could be desired.

Although we have been writing mainly of a method of drying sensitive plates it will be evident that such a drying apparatus would be extremely convenient for many purposes where a steady current of hot and dry air is required—such as the drying of gelatine tissue, emulsion pellicle, &c., &c.; and, if perfectly-dry air should be desired, that could be readily obtained by causing it to pass through fused calcium chloride or other drying material in the entrance tube of the cone.

Altogether Mr. Palmer's paper is well worth the attention of all who work the gelatino-bromide process, or who intend giving it a trial; and the drying arrangement should be carefully studied by all, as it is probably the simplest and most efficient we have seen.

SMALL MATTERS CONNECTED WITH TRANSPARENCIES.

There can be no doubt about the fact that, amongst the most pleasing results obtainable in connection with photography, glass transparencies occupy one of the foremost positions, and being alike capable of affording pleasure and, at the same time, practice during the winter months, when other branches of the art are almost at a standstill, are specially adapted to the requirements of the industrious amateur. But in order to give satisfaction it is necessary that the work should be of the best possible quality, both as regards manipulation and also general finish; for nothing can produce a more deplorable effect upon the casual observer than a badly-printed transparency, or one that has been finished and mounted in a slovenly manner.

Too many of our amateurs are content to produce a tolerable picture as far as regards mere manipulation, and, considering the principal labour accomplished, complete the remaining portion in a slipshod and haphazard manner, trusting to the fact of the picture being a transparency to secure for it a due amount of admiration on the part of their friends. Those friends, however, knowing probably little of the difference between a transparency and a paper print, are apt to judge by the impression made upon their minds by little circumstances, which to the photographer appear paltry and unimportant, and thus fail to give that amount of credit expected by the fond author of the work in question. These thoughts were brought forcibly to our mind a short time since in looking over a collection of pictures belonging to a friend; for a number of transparencies amongst them, though evidently taken from negatives of a high class and printed in a manner nearly perfect as regards manipulation, were nevertheless completely ruined as works of art by the disgracefully careless manner in which the remainder of the labour had been accomplished. Believing, as we do, that there are many others besides our friend who spoil their work by inattention to "little matters" we offer a few hints which may be of use to them.

The first point which receives too little attention at the hands of some amateurs is the glass used for printing transparencies; we are speaking now more especially of stereoscopic ones, which may be taken as the representative class. Though this matter of the glass may to some appear of very slight importance, it will, nevertheless, not be denied that a transparency made upon ordinary crown glass and mounted with ground glass of the same description has, in addition to its weight and bulk, a generally clumsy and unfavourable appearance. The proper glass to use is that known as "French plate" or "French crown," and is little, if any, more than half the thickness of ordinary crown. This is easily obtained, both plain and ground, at a very moderate cost, so that no excuse can be made upon that score. Another point which requires more care is the quality of the ground glass employed. The grain should be as fine and even as possible, for the details in the most perfectly-printed transparency are marred, or even entirely lost, if it be mounted in contact with coarse-ground glass such as we frequently see employed. Many varnishes and other preparations have been recommended as substitutes for the ordinary dulled glass, over which some of them possess decided advantages, while in places where it is difficult to obtain one or other of these preparations may be applied with the greatest advantage. One word of advice, which many of our readers may think totally unnecessary, but which experience has taught us is not the case, is to mount the dulled surface (whether it be ground glass or varnish) next to the picture, and not outside, as some are in the habit of doing; the result of the latter course is that the rough surface becomes rapidly dirty, and in the case of a varnish is soon spoiled by scratches.

The next matter which calls for remark is the margin round the picture. It is scarcely necessary to say that this should be represented by perfectly clean glass; for, indeed, if the manipulation be anything approaching what it should be, this will be the inevitable result. But mere cleanness is not sufficient; the margins should be perfectly straight as well as symmetrical. Some prefer to have a slightly wider margin at the bottom edge of the picture than at the top, which is allowable; but nothing can have a worse effect, or look more untidy, than to have the end margins of varying widths, or to have the inner edges of the two pictures overlapping or inclined to one another at an angle. These are points which only require care, and not any particular skill, and those who transgress in this direction do so from pure carelessnes or natural slovenliness.

In the matter of exposure many find great difficulty, and certainly in that part of the process and the development the whole secret of success lies. We say this because many have an idea that with a good negative, suitable for transparency work, any exposure will do; but such is not the fact. It is possible, by means of judicious treatment in these two respects, to produce from a negative wholly unsuited to the purpose a passable or even satisfactory result, whil on the other hand, bad judgment will produce from the most perfect negative utterly worthless results. The secret is to give no longer exposure than will just bring out the finer details without any pushing, as forcing the development tends to the production of impure whites. With a proper transparency negative this is easy of attainment; but in using the negatives employed for paper printing it is frequently a matter of the very greatest difficulty to secure at once vigour in the shadows and detail in the lights, though they may be combined in the paper print. Over-exposure tends to the production of heavy, sunken blacks or shadows; hence, in the case of a negative possessing too great contrast, the latter become lost before the lights have time to become thoroughly impressed. The best plan in such cases is to give a pretty full exposure, and to use a developer which, while it brings out the image, adds but little to its density. If dry plates be employed a solution of plain pyrogallic acid may be applied until the details are out, when the image may be intensified with silver; or, if the image will not appear under the application of pyrogallic acid alone, a very minute quantity of alkali should be used until the details appear. On no account should any attempt be made to increase the density until the development proper is complete.

If the conditions be reversed—that is, if the negative be thin and flat, or so uniformly dense as to be equally without contrast—much may be done by reversing the mode of procedure just given. The exposure will, of course, depend upon the general density of the negative, but the developer should be applied of full strength at the outset and every means used to induce contrast or vigour. Thus, if the alkaline developer be employed, it should be rich in both pyro. and alkali, and at the same time well restrained by a liberal use of bromide, and should be made of the full strength at the commencement of the development. As soon as the details are visible—which will probably be almost simultaneously with the better-lighted portions of the picture—wash off the developer and proceed to intensify with silver. If after fixing, in spite of all precautions, the transparency lack contrast the following plan, though perhaps not strictly correct in theory, will frequently give an improved result:—Wash thoroughly, and treat the film with a very weak solution of iodine, or, better, chloride of copper, the object being to convert a minute portion of the silver of the image into a haloid, to be afterwards removed by means of hyposulphite of soda.

It is obvious that where the silver deposit is the thinnest, viz., in the half-tones and shadows, the effect produced will be the more marked, and by judicious treatment the deepest shadows may be converted into nearly, or quite, clear glass without injuring the due gradations in the half-tones. To produce this result, however, the solution of iodine or cupric chloride must be very dilute, and the action allowed to proceed for only a short time, when, after washing, the effect may be tried by treating the plate with hypo. If the shadows be not yet clear the operation is to be repeated. Having obtained a thin image with clear shadows convert it into chloride of silver by means of cupric chloride, as described by us last year, and re-intensify by means of the alkaline developer; this method not only produces any required density but also acts as a toning agent, a most beautiful assortment of tones being obtainable.

If the amateur be not afraid of silver development we should recommend it in preference to the alkaline, when the object in view is to obtain the greatest possible contrast. The silver method is much slower than the alkaline, and, therefore, more under control, while it has a natural tendency to give greater contrasts than alkaline pyro., as the high lights, after their appearance, continue to gain density, while the more feebly-lighted portions are developing. The operation may also be stopped at any stage, the image fixed, and, if not dense enough, strengthened by a further application of the pyro. and silver. This could not so well be done with alkaline pyro., as the feeble image produced in the first stage of the latter method is almost totally obliterated by the fixing agent.

A word or two may not be out of place on the subject of toning. This operation is scarcely necessary if the transparency should have been reinforced with acid silver, and is only required to be viewed by transmitted light. But silver as well as alkali-intensified films have generally a very disagreeable colour by reflected light, and many amateurs object to this. The use of a weak solution of chloride of gold obviates this difficulty, but, unfortunately, the colour thus given is too cold to suit many tastes. The best toning agent we have used is chloride of copper, followed by an application of alkaline pyro.; any tone by transmitted light is attainable, while the colour of the deposit by reflected light is either black or a deep warm brown. On no account resort to any of the formerly-recommended methods of toning by mercury; the colours, though beautiful to the eye, are evanescent, and sooner or later the picture becomes one shapeless blotch.

We have devoted more space than we originally intended to the chemical portion of this subject, though the hints we have given will be certain to prove useful to some of our readers; and if in addition to what we have said they will only bear in mind that care and neatness are essential points in the programme, they cannot fail to produce such a class of work as will please not only themselves but also their friends.

In connection with the subject of oxyhydrogen explosions referred to in the letter of Messrs. Mawson and Swan in another column, while we are entirely at one with them respecting the desirableness of absolute safety being ensured by using the oxygen alone in a bag under pressure, and obtaining the supply of hydrogen or coal gas from the main—this to be used in connection with a jet in which the mixture of the gases is rendered quite impossible within the precincts of the burner—it is, nevertheless, true that the majority of exhibitors of pictures by the lantern greatly prefer using the hydrogen as well as the oxygen from a bag under pressure. Not only is this the case, but a marked preference is still evinced for that form of burner in which the gases are mixed previous to their issuing from its jet. The reason for this preference is the better light which is alleged to be obtained. The pressure on the mains is so fluctuating, and is frequently so slight, as to render this source of supply comparatively useless for the "mixed gas" jet, in which uniformity of pressure is of great consequence. Although it is true that when the jet is constructed of large capacity the variations in the pressure of the hydrogen do not so greatly affect the steadiness of the light, yet the very slight advantage obtained by the adoption of this form of burner does not adequately counterbalance the disadvantages and dangers with which it is connected. It cannot be too strongly reiterated that a jet of the "safety" or "blow-through" class secures immunity from explosions, seeing that such is absolutely impossible so long as the oxygen is prevented from mixing with the hydrogen.

The letter of Mr. H. B. Berkeley in our correspondence columns last week refers to several matters connected with emulsion photography which appear not to be yet fully understood. With regard to the use of methylated solvents in the formation of emulsion, we have never experienced any difficulty in obtaining them sufficiently pure to answer all the purposes of the pure products, and have carefully tested one against the other without discovering any difference in sensitiveness or general behaviour. The use of methylated ether and alcohol in the second stage of the washed emulsion process can give rise in our mind to no species of doubt, as there is no free silver to act in any way upon its impurities; but, we believe, there is a too general opinion that alcohol, if methylated, is therefore necessarily more or less impure. Such is, however, a mistake; we have found that the higher grades of methylated solvents are at least as free from impurities as the higher-priced samples containing no methyl. Such a sample, obtained in the ordinary course of commerce, we have used for sensitising the emulsion, and even when boiled with silver nitrate it has shown no appreciable discolouration. The weaker grades of alcohol are not so good—whether from intentional adulteration or carelessness in storing we cannot say; but, in such cases, if a drop of nitric acid be added to the test-tube containing the alcohol and silver not the slightest ill effect will be produced. Or the plan of exposing to daylight in the presence of a trace of silver nitrate may be resorted to, yet is scarcely necessary. We are not aware if Mr. M. Carey Lea has experimented with iodide of silver in gelatine emulsion; but we remember trying it ourselves at the time we were experimenting with the chloriodo-bromide process last year. Our impression was slightly unfavourable as regards sensitiveness, though density was more easily attained. No difficulty was experienced in emulsifying the iodide, as is the case in collodion emulsion; in fact, if any advantage should attach to the iodide, a gelatino-bromo-iodide emulsion is as easily made as a plain gelatino-bromide.

GLYCOCINE.

Preparation.—The methods given in our chemical text-books for the preparation of glycocine by the action of acids and alkalies upon gelatine are not very clear or very satisfactory. In Braconnot's (the original method), the liquid obtained by the action of sulphuric acid requires to be placed aside for a month* to crystallise. Mulder also finds fault with Braconnot's method that the resulting glycocine contains leucin, and recommends to attack the gelatine with potash-ley, because it is in this way very little leucin is formed. Nevertheless, under the head of "leucin" he recommends precisely this potash process as the best means of obtaining leucin.

In the sulphuric acid process, which is that which I have employed, there has been hitherto too much acid and too much heat employed. By essentially changing these conditions I have been able, instead of waiting a month for crystallisation, to obtain crystals of sulphate of glycocine before the vessel was removed from the heat.

Method.—Twelve ounces of gelatine (good light or white glue answers sufficiently well) are to be soaked over night in twenty-four ounces of water, then six fluid ounces of sulphuric acid added, and the mixture boiled for two hours in a loosely-corked flask—*not* in an uncovered vessel, as the exclusion of the air is desirable. At the end of this time, if the operation has been properly performed, or even before it, a dirty sandy powder will have deposited itself at the bottom of the flask. The liquid is allowed to cool, is decanted off the powder, and exposed for evaporation in a wide flat vessel, by which more crystals may be obtained.

The crude sulphate of glycocine is cleaned by rapid washing from the excess of dark liquid (this needs care, as the crystals are very soluble). They are next to be dissolved in a moderate quantity of water, shaken up with precipitated chalk as long as effervescence results, then mixed with animal charcoal, and, after standing a few hours, filtered from the chalk, animal charcoal, &c., and evaporated at a gentle heat.

* Gerhard, Ch. Org. I., 215.

The glycocine thus obtained is free from acid, and (if the liquid when treated with chalk was cold) nearly free from bases, though not perfectly free from leucin,* which, however, is unimportant for photographic purposes. Glycocine when free from acid does not easily crystallise (the contrary statement in the text-books appears to be incorrect). When sulphuric acid is present sulphate of glycocine is immediately formed, and this body crystallises easily.

Applications to Photographic Uses.

Trial in Emulsions.—Glycocine was easily introduced into an emulsion, along with the silver nitrate, using about one-tenth as much. The emulsion thus prepared was a little better than that made in the ordinary way to compare with it; the difference, however, was not material.

As a Preservative.—When emulsion plates are made with a bath glycocine may be added in the proportion of two grains to the ounce, together with gum and sugar. A high degree of sensitiveness is obtained, but, as equally good results can be got with gallic acid or pyrogallol, I have never thought it worth while to adopt glycocine for regular use when other substances are as good or better, and can be obtained commercially.

For Positive Printing.—If to a printing bath containing fifty grains of silver nitrate to the ounce glycocine be added in the proportion of six or seven grains to the ounce of bath, albumenised paper sensitised on such a bath prints much more rapidly than when sensitised on the same bath without the glycocine. When the two sorts of paper are placed side by side in a good diffused light it is observable that the glycocine paper prints about twice as fast as the other. It also bronzes much sooner and more deeply. Tried under negatives it seemed to give rather better prints than corresponding trials made on paper treated in the ordinary way on the same strength of bath. That there is some gain by its use is certain, but whether in practice it will be found worth the trouble of preparing the glycocine I am not prepared to say.

In reviewing, therefore, the whole question of the utilisation of the decomposition products of gelatine, I conclude—that the collo-developer is very useful; is easily made by any photographer possessing a very moderate knowledge of chemical manipulations, or might advantageously be manufactured for sale; that glycocine is not a factor—at least not an essential factor—in its functions; that glycocine has a well-marked action in increasing the sensitiveness of photographic preparations of silver; that, as respects silver printing, it may be useful; that, as respects its use in emulsions and preservatives, it has good qualities, but does not appear to be better than other substances more easily attainable. M. Carey Lea.

* It can be freed from leucin by recrystallisation from alcohol.

EXPERIENCES IN WORKING GELATINO-BROMIDE EMULSION.

[A communication to the Edinburgh Photographic Society.]

I have been requested to supplement the remarks upon the gelatine process which I was privileged to make at the January meeting of your Society by a paper upon the same subject, supplying the results of my experience with greater detail than I was able to afford in the cursory *résumé* I then endeavoured to give. I comply with the request with much pleasure, in the hope that the following details may be of some use to those who are anxious to give gelatine a fair trial, and that they may thus be speedily convinced of the many advantages it possesses over all other processes, whether wet or dry.

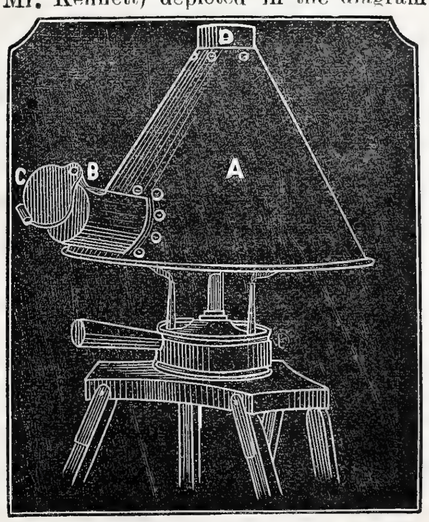
Among these advantages I may mention the following:—It alone will give absolute instantaneity in a good light; it is simpler and more certain in its mode of working than other processes; the largest plates may be coated with it with absolute certainty of success, and at the cost of a mere trifle; the fumes of ether, so noxious to some invalids, are abolished; the cumbersome paraphernalia of the wet process are superseded; portraits and interiors may be taken at any distance from home; and last, and not least, it is the most inexpensive process a photographer can adopt.

I propose to notice first the main causes of failure with gelatine, and these, I think, may be resolved into three:—1. The character of the light in the working room. 2. Want of patience in preparing the emulsion. 3. The length of time allowed to the plates to dry spontaneously.

As to No. 1 of these causes I may remark that it is a mistake to imagine, as some do, that gelatine emulsion and plates can only be prepared in the gloomiest of lights, and, therefore, in the greatest discomfort. It is not the quantity of light in the laboratory which is so often the cause of fog so much as its character. The first thing, then, is to ascertain the amount and quality of light by which this process can be worked without risk. I have made many experiments with different kinds of ruby and professedly non-actinic glass, and find in practice that Forrest's non-actinic orange, *plus* one thickness of orange tissue-paper, gives absolute freedom from fog, even with bright sunlight passing through it. Accordingly, in my workroom I have a wooden lantern standing in the centre of the top of my drying cupboard, by the light of which I work with the greatest ease and safety. The lamp burns paraffine, gives a very bright light, and I wrap around the glass one thickness of orange tissue. In the front and sides are three sheets of Forrest's non-actinic orange glass (each pane being 18 × 12 inches), and at the top and bottom of the back there are apertures to give ingress and egress to the air.

The next cause of failure on my list arises mainly from over-haste in passing the emulsion through the fine linen filter. The gelatine receives a preliminary soaking of half-an-hour and is then placed in a hot bath, frequent shakings being administered to effect the solution of the pellicle. It is next passed through fine linen to remove bubbles, &c.; but very often the last operation is performed too soon, and, on examination, the linen is found to contain a portion of the pellicle undissolved. The result of this will naturally be a batch of plates which will afford the thinnest of negatives, and which will obstinately decline intensification of any sort or kind. To avoid this the emulsion should be mixed, and solution of the pellicle obtained, by frequent stirrings with a glass rod (the bottle containing the gelatine being in a hot bath the while), and on no account should the emulsion be passed through the filter so long as any soft substance can be detected with the rod at the bottom of the bottle. The result of too long protraction of the process of drying is not evidenced until the time comes to develope a picture, and then it will make itself manifest in blisters in the centre and in frillings at the margin of the plate. In damp weather it is sometimes well-nigh impossible to get the plates to dry spontaneously, and it is no easy matter to raise the temperature of the room to just the proper height to secure speedy drying.

The small apparatus (for the idea of which I am indebted to Mr. Kennett) depicted in the diagram answers admirably for this



purpose. A is an iron cone, firmly fastened to a circular base of the same metal; B is the inlet for air, with a movable cover (C) to regulate the supply; D is the outlet, and this is fixed in an aperture at the bottom of the drying cupboard; the lamp underneath is called the "Rechaud spirit-lamp." My cupboard contains four shelves, accurately levelled, and sufficiently capacious to hold eight dozen quarter-plates or two dozen 9 × 7. The top is my operating table, and in front are light-tight doors, with lock and key to baffle inquisitive visitors to the dark room. After coating a batch of plates they are placed in succession upon the shelves, the doors are closed, the lamp lighted, the supply of hot air regulated at pleasure, and in a few hours the whole batch will be ready for use.

Without doubt the simplest and safest plan is to prepare the emulsion with Kennett's pellicle. This is done as follows:—Two ounces of distilled water are poured upon eighty grains of pellicle in a four-ounce, wide-mouthed bottle. In about half-an-hour the bottle is placed in a vessel of hot water and thoroughly stirred until the gelatine is entirely dissolved. If, however, it be desired to make the emulsion *ab initio* the following formula will be found to answer well:—

Nelson's gelatine	40 grains.
Distilled water	14 drachms.
Alcohol	2 ,,
Bromide of potassium	25 grains.
Nitrate of silver	40 ,,
Twenty-grain-per-ounce solution of bromide of ammonium	2 drops.

Let the gelatine be soaked for five or six hours in water and be then drained. The bromide is next dissolved in seven drachms of water and poured upon the gelatine. The latter is now treated to a hot

bath and stirred with a glass rod until complete solution has taken place. The silver is then dissolved in seven drachms of water, and is poured, little by little, into the gelatine, the whole being frequently shaken. After this two drachms of alcohol and two drops of bromide of ammonia are added, and the emulsion is poured into a flat dish until it has set. It is then cut into strips with a slip of glass, placed in a sieve with fine linen stretched over the bottom, suspended under a tap to which a rose has been fastened, and thoroughly washed for six hours at least. After draining it is treated to a hot-water bath until completely liquefied, and then distilled water is added to bring up the amount to two ounces.

I will now give the details of the preparation of gelatine dry plates in proper sequence. On the top of the drying cupboard are the following articles :—The wooden lantern is in the centre, and to the right of it a flat hot-water tin, covered with a sheet or two of blotting-paper. This is used to give warmth to the plates when coating those of large size. Small plates do not require to be warmed. On the right side also I have an infants' food-warmer, with the burner alight, a little hot water in the tin boiler, and the porcelain cup clean and empty, and ready to receive the emulsion. I need hardly say that the light emitted by the burner must be carefully screened off with brown paper. On the left are the clean plates, a brush for sweeping each plate before coating, a pneumatic plate-holder, and a glass rod in a vessel of warm water (for large plates only).

It is unnecessary to urge the importance of clean plates ; but I may notice here an advantage of this process over every other with which I am acquainted, viz., that old gelatine plates merely need to be placed under a tap of hot water until the film is dissolved, then thoroughly rinsed, and polished with cloth and leather without further trouble. The emulsion must be filtered through fine linen into the porcelain cup of the food-warmer; the filter-bag should rest against the side of the vessel, to prevent bubbles in the filtered emulsion. If the plates be of small size it will be found that the gelatine flows, after a little practice, as easily as collodion without the assistance of a glass rod. Large plates, however, must be warmed (or the gelatine will chill and thicken), and can then be coated with the greatest ease, as follows :—A pool is poured from the lip of the cup, along the right hand margin of the plate from corner to corner. The emulsion is then swept before the glass rod to the other end, without endeavouring in the least to secure evenness of film. This is effected by now flowing over a fresh supply of emulsion, and the surplus is disposed of by allowing a corner of the plate to touch the side of the cup.

Two things to be avoided in the process of coating are bubbles on the film or in the emulsion, and over-draining of the plate, and consequent thinness and weakness of the negative. The whole process, whether with small or large plates, is done with great ease and rapidity, the chief desideratum for comfortable working being a pneumatic holder, which may be relied upon to cling fast to its plate. As soon as the coating is effected the plates are put one by one upon the level shelf below until all are finished, the doors of the drying cupboard are closed, the lamp below is lighted, and a stream of hot air is sent over the films until they are dry.

As regards exposure, it should be borne in mind that Kennett's rapid pellicle and plates are, with good light, really instantaneous. Nothing can surpass the cloud, wave, and street views taken with this preparation ; and for babies' portraits it is simply perfection itself. The ordinary pellicle is much slower, and admits of considerable latitude of exposure. On a bright January day I exposed six plates, experimentally, upon a well-lighted subject, giving ten, twenty, thirty, forty, sixty, and one hundred-and-twenty seconds respectively. I developed with a three-grain solution of pyro., using, at first with two drachms of developer, one drop of a one-in-sixteen solution of strong ammonia. All came up to printing density without any intensification. No. 1 was wanting in detail ; 2, 4, and 5 were fair negatives ; 3 (thirty seconds), perfection ; 6, spoilt from over-exposure. The lens used was Dallmeyer's medium-angle rectilinear for quarter plates, and the stop was the smallest of the five. These ordinary pellicle plates require rather more than half the exposure requisite for a wet plate.

I do not recommend anyone to deviate from the directions as to developers and the methods of using them supplied by Mr. Kennett. In my own practice, however, I prefer, after washing a plate well till the water flows everywhere upon the film, to soak it for a time in a three-grain pyro. solution, and to bring out the picture with one drop of ammonia to a quarter-ounce of developer, gradually and cautiously adding the alkali till printing density has been obtained. If intensification be necessary, no process can compare for safety and certainty with the chloride of copper. The negative is placed in a solution of chloride of copper (the strength seems to matter very little) until the image has disappeared ; and then, after abundant washing, a strong alkaline developer brings up the picture to any amount of intensity. I use one drachm of a one-in-sixteen solution of strong ammonia to one ounce of a three-grain pyro. The golden rule to be adopted throughout the development of these plates is—"Give them abundance of water." Nearly all the ills that gelatine films are heir to after exposure are due to insufficient washing.

I have found no advantage from backing gelatine plates, save in the case of negatives of interiors. In these it is absolutely necessary to use it, if it be desirable to avoid blurring round windows, &c.

And now I draw my lucubrations to a conclusion, in the hope that, in addition to the fatigue and possible impatience which I fear I must have occasioned to those who have been good enough to listen to this paper, I may have stimulated some one to put away his collodion and troublesome bath and to try gelatine.

H. J. Palmer, M.A.

P.S.—Since the above paper was written Mr. Kennett has informed me that negatives of exceeding beauty and brilliancy may be obtained by substituting mild ale for the water in preparing the gelatine emulsion.—H. J. P.

FOREIGN NOTES AND NEWS.

Dr. Vogel on the Action of Light upon Bromide of Silver.—Duplicate Negatives.—Unbreakable Baths.—German Manual of Carbon Printing.—Reproduction of Works of Art in the Louvre.—A Novel Application of Photo-Chemistry.—A New Method of Keeping Plates Moist.—Inscriptions upon Negatives.—The Yellowing of Silver Prints.

In the current number of the *Mittheilungen* Dr. Vogel gives a short account of the results obtained during the last three months' course of experiments on the action of light upon pure and coloured bromide of silver, which are briefly as follow :—

1. Pure bromide of silver, with a long exposure and strongly-actinic spectrum, appeared sensitive as far as the ultra red. He obtained some plates in which the line A was distinctly visible, besides the ultra red, upon a space similar to the distance between the lines A and B. A picture of the whole visible spectrum was photographed upon these plates. Chloride of silver was also sensitive as far as A, and dry bromo-iodised silver even beyond it.

2. Amongst the earlier dyes with which Dr. Vogel attempted to increase the sensitiveness to light of bromide of silver for those parts of the spectrum which they absorb were methyl-violet and cyanin. The latter dye was obtained from Herr Hofmann, and gave an extraordinary increase of sensitiveness for orange. Aniline blue, night blue, purple lac, indigotine, and purpurine, on the contrary, had no such favourable effect. On this branch of the subject Dr. Vogel intends to write, on a future occasion, at greater length.

3. The colouring of the bromised film, which was formerly done by adding colouring matter to the collodion, is much easier if an ammoniac solution of the dye be simply poured over the prepared bromised silver plate, and then allowed to dry. In this way colours may be used which would be destroyed in the collodion or the silver bath by the action of the free acid—such, for example, as cyanin.

4. As already mentioned, it is disadvantageous to colour the film too strongly, as in that case the light is too much weakened by the colour on the surface of the film before it reaches the sensitive bromide of silver molecules, which necessitated many preliminary experiments in order to ascertain the proper intensity of colour ; but this trouble can easily be avoided by exposing the wrong side of the dyed bromised silver plate to the spectrum, so that the rays must pass through the glass before reaching the silver particles. In this way the relation in which opaque, or almost opaque, dyes stand to bromide of silver can be ascertained. The want of sunlight at this season of the year has put a stop to Dr. Vogel's experiments for the present ; but he is glad to think that Captain Waterhouse, who has also taken up the subject, can work under more auspicious circumstances, where there is no want of sunshine, and where the vegetable growths of the tropics furnish him with many interesting dyes.

When speaking of a proposed way of mending broken negatives Dr. Vogel recommends that, as prevention is better than cure, a carbon transparency of every valuable negative should be kept, from which a new negative might be taken should anything happen to the orginal. But why not go a little farther, and get the second negative from the positive at once and print from it, storing the valuable

original negative? Of course this is no new idea; for if duplicates of negatives be not often manufactured in some such way, how would the ever-increasing demand for the portraits of eminent persons be met? It is incredible that any eminent man, however vain, would sit until the necessary number of original negatives could be obtained.

A writer in the *Mittheilungen*, who signs himself "H. S.," suggests a method of preventing the breaking of upright baths enclosed in wooden cases during a journey. Melt some paraffine and pour it into the wooden bath-holder; warm the glass bath before the fire and then push it slowly into the mass of melted paraffine. The bath will then adhere fast to the wood in every direction, and is capable of withstanding the tightest screwing-on of the india-rubber top without breaking.

For some time back, in consequence of Mr. J. R. Sawyer's visit to Berlin, German photographers have given a good deal of attention to the Autotype Company's carbon process, but there still seemed to be a considerable degree of misapprehension as to some of the details of the process, especially amongst those residing at a considerable distance from the capital. These difficulties they will now be able to overcome by another outcome of Mr. Sawyer's visit, namely, the publication of a manual *On the Photographic Pigment Process; or, Carbon Printing in its Newest Developments*, by Professor Vogel and Mr. J. R. Sawyer.

The Minister of Public Instruction, who recently paid a visit to the *atelier* of M. Vidal, in Paris, has accorded permission to M. Dalloz, the manager of that establishment, to reproduce, by means of photochromy, the works of art in the museum of the Louvre. This is an unusual privilege, and promises to do much in the way of spreading artistic taste by affording the public an opportunity of obtaining, at a small cost, faithful representations of the numerous treasures contained in the Louvre. The following extract from the official letter granting the permission shows sufficiently the feelings which have prompted the Minister in coming to the decision he has:—"In according you this exceptional favour the Minister has taken into consideration the remarkable results already obtained by means of photochromy and the influence it must have upon the popularisation of these *chefs d'œuvre* and the development of public taste."

We are told in *La Photographie et la Chimie de la Lumière* that during the late Franco-Prussian war one of the chief articles of food supplied to the German army consisted of a sort of prepared or preserved vegetable, which required packing in air-tight packages. Thousands of persons were employed daily in the preparation of this aliment; but the chief difficulty lay in finding a supply of suitable packages. It was at last decided to try vegetable parchment; but another difficulty arose—no glue could be found with which to make the parchment adhere that would withstand the effect of boiling water, it being a necessary part of the process of preparation to boil the vegetables after enclosing them in the package. Photochemistry, however, came to the rescue, and Dr. Jacobson succeeded, by using a mixture of gelatine and bichromate of potash and exposing the junction to the action of light, in effecting the purpose desired.

At a late meeting of the Brussels section of the Belgian Photographic Association M. Watrigant described a method which he had used with success for the purpose of retaining sensitive films moist for a length of time. After sensitising the plate a thin strip of india-rubber was placed round the edges, and a second sensitised plate superimposed. The result of this is that the two moist films, separated by the india-rubber edging, shut in the moisture and entirely prevent evaporation or desiccation of the sensitive surfaces. By this means, it is stated, the plate may be retained in perfect condition for forty-eight hours. The sole inconvenience of this system, M. Watrigant naïvely concludes, is the necessity for separating the two plates in the dark before exposure; hence he had attempted to use a plain glass for covering the film, but had found that this glass attracted moisture to itself, interfering materially with the sensitiveness of the plate, which, under these circumstances, became partially dry.

At the same meeting M. de Blochouse spoke of a method he employed for placing inscriptions upon negatives. It consists in removing the collodion from the portion of the plate where it is desired to place the inscription, and to replace it with paper nearly the same tint as the surrounding portions of the negative. Upon this paper the inscription may be written and appears white in the print. Why not write directly upon the collodion film?

In speaking of the yellowing of silver prints, Herr Bachrich, in the *Correspondenz*, says that some people may think his remarks ill-timed, now that we are on the eve of exchanging silver for carbon, but that, as an old disciple of Daguerre, who has seen the appearance and disappearance of many new processes, he may be excused for holding firmly to his belief in the old process and considering how best to remedy its defects. Wothlytype at one time kept all who dabbled in photography in suspense. The problem seemed solved and the goal reached. Then innumerable other methods made their appearance, and the uranic salt again sank into oblivion so far that at present Herr Bachrich does not know of a single photographer in the whole of Austria who uses the Wothlytype process. It would be superfluous, as he says, to recapitulate the reasons why we have not been able to make friends with this process, and can only look upon it as a beautiful result of science without ascribing to it any particular practical importance. The same might be said of many other processes, none of which have as yet been able to dislodge chloride of silver from the favour of the profession generally. Chloride of silver prints have two cardinal faults—they turn yellow and are not durable. It is principally with the first of these faults that Herr Bachrich concerns himself at present. He says:—

"It is usually supposed that the yellowing of silver prints is caused sooner or later by the presence of that hyposulphite of soda which is so difficult to remove; but many professional men of great experience, and known to us as searching inquirers, assert that their pictures become yellow from other causes, as with the strongest chemicals at their command they have been unable to detect the presence of even a trace of hypo. That I agree with this view of the case the reader will understand when I have related an occurrence for which I can vouch. One summer, some years ago, I had occasion to leave home for some weeks, and my assistant, who had taken my place for the time, produced only citron-yellow prints, which the uninitiated might have supposed to have been printed upon yellow paper. On my return my first work was to find out the cause. I watched the printing myself, in order to ascertain whether any unusual proceeding on the part of my assistant was to blame for the yellowing; but, on fixing them, I found to my astonishment that my prints were quite as yellow as his. The situation was critical. I tried another sort of paper, and again met with the same result; then yet another sort, obtained from a different house, but with no better result, so my conjecture that the paper was to blame was shown to be groundless. It then occurred to me that it might be the water stored in the reservoir, which was used for the washing before toning, that was at fault; and this proved to be the case, for as soon as freshly-drawn water was used the pictures were white, and did not show even a trace of yellowing. Thus there may be a possibility of pictures becoming yellow in time, if the water in which they were washed were impregnated with any deleterious matter; and that not only in the case of chloride of silver prints, but also in photographs produced by methods in which hyposulphite is not used at all, the water may be the cause of yellowing. But I have already touched upon the bad effects of not paying due attention to the condition of the water in the negative process in an article written in 1874.

"With regard to the second point—namely, the durability or, rather, want of durability of silver prints—I will limit myself to saying that, in my opinion, a perfectly-fixed picture—that is, a picture perfectly free from chloride of silver—should not fade even after the lapse of years. And I hope the reader will not consider that I take an unwarrantable liberty if I remark that, as a rule, the fixing is not so carefully attended to as it should be, and that not seldom pictures which still contain a considerable quantity of chloride of silver are taken out of the soda and thrown into the washing apparatus. Here, as in everything else, if the carelessness be removed the bad consequences no longer remain behind."

Whatever be the cause of fading, the present writer can affirm that he has in his possession several portraits upwards of twenty years old that are as fresh as the day they were printed, one portrait in particular having been exposed to the light the whole of that time and having often been subjected to not a little rough usage.

CARBON PRINTING PAPER.

[A communication to the Glasgow Photographic Association.]

The subject I bring before you to-night will be the manufacture of carbon printing paper or tissue, and the patents connected therewith, as it is of vast importance to the profession that a clear understanding should exist on these matters, and that no impediment should be placed in the way to arrest the progress of this important branch of our art.

There is no doubt that, hitherto, the Autotype Company have done much to the advantage of our profession; but at present I humbly conceive they have taken a questionable step in the monopoly they are attempting of issuing licenses for seven years for £1 per annum, and binding the licensees to the illiberal condition of taking all the materials from them or their agents, thus precluding all such from using any improved tissue that may be discovered during the above period, or of purchasing their materials at cheaper rates than the Company may please to establish—conditions, in my opinion, unfavourable to the true interests of our art.

I will give you a method of preparing a carbon printing paper which, in my opinion, is more suitable than that usually adopted, and it can be carried out by any photographer. About three weeks ago I had an

intention of making some experiments in carbon printing; I called on the agents for some carbon tissue, but, imagine my astonishment, when I was asked if I had a license. On answering in the negative, I was informed that they could not sell me any unless I held a license.

Now, just think of a gentleman like Mr. George Mason (whom we all respect) being placed in such a position with his customers. I may state that the exclusive position taken by the Autotype Company forcibly brought back to my memory a number of experiments I had made years ago in relation to the carbon printing process. At this point it will be necessary that I should go back for about forty years to trace the progress of carbon printing and the chemicals connected with it.

On the 29th of May, 1839, Mr. Mungo Ponton announced to the Royal Scottish Society of Arts that bichromate of potash might be used to sensitise paper.

In 1840 M. E. Becquerel used a combination of bichromate of potash and iodide of starch for the same purpose.

In 1843 Mr. Hunt used a mixture of bichromate of potash and sulphate of copper as a sensitising solution, developing with nitrate of silver.

In 1854 Herr Paul Pretsch used gelatine, bichromate of potash, nitrate of silver, and iodide or bromide of ammonium.

In 1855 M. Poitevin patented a process. A mixture was made of a solution of albumen, fibrine, gum, gelatine, or similar organic substance, and a concentrated solution of chromate or bichromate of potash was added. A design was produced by mixing a suitable colouring matter, and, when the photograph was impressed, those parts which had not been acted upon by light were washed away. A design in various colours was produced by applying different colours to different parts of the surface.

On August 24th, of the same year Mr. Archer patented a process for the transfer of photographs from glass, by first coating the glass with a solution of gutta-percha in benzoin, coating with collodion, and, when the picture was taken, again coating with gutta-percha and removing the film from the glass.

On September 1, 1856, Mr. Hill patented a process to transfer photographs from glass to a gelatine film.

In 1857, Mr. Cowper patented the following process:—The paper was floated on a bath of bichromate of potash, or ammonia mixed with gelatine; it was then dried and its surface covered with the pigment. The pigment could be rubbed over the surface with a pad, Indian ink could be mixed with the gelatine, or oil-colour might be applied over the surface. Rollers, presses, or other apparatus could be employed.

The following is Mr. J. Pouncy's patent of 1858:—Coat the paper with carbon, gum, and bichromate of potash. Expose under a negative and wash with water, which dissolves the parts on which light has not acted. Sometimes for carbon he substituted bitumen.

From the *Bulletin*, 1860:—*M. Fargier's Process.*—"It is about two years ago since I first heard of photography in carbon, and observed the action of light upon a mixture of bichromate of potash and organic substances, such as gelatine, albumen, and gum. Even before the publication of the process of M. Poitevin and others the idea had occurred to me of spreading on paper a mixture of gum, bichromate, and black, coagulating by light. I have since substituted gelatine for gum, and collodion for paper."

Mr. R. A. Archibald's Patent of 1861.—A coating of gelatine, carbon, and bichromate of potash is spread on a plate and allowed to dry, exposed to light, and a coating of plain collodion poured upon the gelatined surface. The film is removed from the glass and received upon a sheet of gelatined paper.

In 1861, Mr. Blair wrote in *Photographic Notes*:—"M. Fargier lays the carbon print on collodion, and by transference preserves the print upon the upper surface, and thus keeps the picture entire, the back portions disolving away. So satisfied was I, long ago, that this principle was correct, that I transferred the carbon after exposure on to gelatined paper with the view that the impression might be on the surface."

In 1861 M. Poitevin published a process for carbon printing by perchloride of iron and tartaric acid, and, after exposing to light, coating with collodion, laying a sheet of paper thereon, and detaching the film from the first support on to a sheet of gelatined paper.

Messrs. Cutting and Bradford, Boston, U.S., published a printing-ink process, and claimed the use of gum, sugar, and soap to unite the ingredients.

M. Poitevin's method, in which soap is largely used in the process, was described in The British Journal of Photography for 1863:—To one pint of water add fifty grains of gelatine; this is to be coloured with carbon or other colouring matter. The solution is placed in a dish and kept warm, the sheets of paper are floated thereon, so as to obtain an evenly-coloured coating on one side. After removal from the gelatine the sheets are to be laid, face upwards, on a flat surface. A number of sheets may be prepared for further use.

On the 29th of January, 1863, Mr. Pouncy patented a process for obtaining photographs in printing-ink and transferring the same. To coat the surface of the paper he employed carbon, tallow, oil, soap, bichromate of potash, bitumen, or both, developing in benzoin or like spirit.

On February 29th, 1864, Mr. J. W. Swan patented a process, and this is the first of the patents held by the Autotype Company. To the surface of glass or other substance he applied a coating of collodion, and then a sensitive gelatine solution containing colouring matter. When dry this was separated from the glass plate, and might be used as ordinary photographic printing paper. After exposure the tissue was mounted, face down, on a temporary support. When tissue is mounted on the support to which it is to remain the process is complete when developed; if for transfers, when transferred to the permanent support. The composition of the tissue was gelatine two parts, water eight parts, sugar one part, and colouring matter as required. Add about one part of a saturated solution of bichromate of ammonium to ten parts of tissue compound. In coating paper Mr. Swan moved it in lengths through a trough holding the composition. He applied the sensitiser afterwards. Solution of india-rubber was employed for the temporary mounts.

Mr. J. R. Johnson's Patent, February, 1869.—"My first improvement consists in mixing colours with gelatine and sugar, allowing to dry, and then cutting up into cakes. My second improvement is for making tissue in continuous lengths by rollers, or I spread the compound on a film of wax or similar substance supported upon a plate of metal or other impermeable substance. I expose this under a negative, and cement the exposed face to another surface. I then warm the plate, leaving the gelatine layer attached to the support to which it has been cemented. It is now subjected to the ordinary treatment. My third improvement is for cementing the picture to the permanent support. Instead of gelatine or albumen I prefer pine resin or shellac desolved in water, in which caustic ammonia is added. My fourth improvement is based upon the observation that, if the support be impermeable to water and the tissue be well exposed, no cementing material is required for mounting; all that is necessary is to exclude the air."

Mr. F. R. Window's patent of October 19, 1869, is as follows:—"The solution I prefer using is honey two parts, glucose four parts, albumen three parts, dextrine one and a-half part, saturated bichromate and ammonium seven parts. When exposed I brush powdered pigment over the surface, and fix by pouring alcohol or naphtha over the picture."

Mr. J. R. Johnson's Patent, January 22, 1870.—"The first part of my invention consists of substituting for sugar a substance which will give flexibility to the tissue, shall be soluble in water, and insoluble in the sensitiser. The pigment solution is made with one pound of gelatine, four and a-half pounds of water, lampblack one hundred grains, and soft soap one ounce. To sensitise take double chromate of potash and ammonium one and a-half ounce in the smallest quantity of water, to which add a few drops of liquid ammonia. It has been usual to employ printers' ink and other pigments ground in oil for the production of photographic pictures, mixed with tallow, soap, &c., and bichromate for the preparation of the paper; but in some cases the paper so prepared is sometimes treated with turpentine or naphtha after exposure. Instead of bitumen I use gelatine and bichromate to fix the oily pigment when a soluble soap forms part of the composition, and when exposed to light wash with hot water. My third improvement consists in replacing the gelatine wholly or in part by a curd obtained by thickening with rennet skimmed milk, as in cheese-making, and redissolving in ammonia. A pigment thus formed is developed in hot water with a few drops of ammonia."

Mr. J. R. Sawyer's Patent, October 29, 1874.—"For the preparation of temporary supports for the development of carbon prints my invention consists of applying an aqueous solution of shellac in borax to the surface of paper, glass, metal, &c., and then treating the surface with a solution of wax or resin dissolved in benzole. When I use paper I coat with a solution of gelatine containing five per cent. of chrome alum, and when dry varnish with a solution consisting of sixteen ounces of bleached lac and five ounces of borax in eight pints of water, and digest at a high temperature. I now rub over the surface a few grains of wax and resin dissolved in benzole to make the print leave the support."

The last five are the Autotype Company's patents.

I now come to M. Lambert's patents. The first is dated May 8, 1874:—"My invention is for retouching negatives, whereby all retouching proofs on paper is unnecessary. A large negative is taken in the usual way by salts of silver or chromium, and covered on both sides with a sheet of thin paper prepared with paraffine. It is on these two surfaces, which enclose the negative or positive, that the retouching is effected where necessary; either on the collodion side or the other side a galvanoplastic or other fine powder is applied with a stump or blacklead pencil. Should the negative be hard the print may be softened by interposing a thin sheet of glass between the negative and the paper before completing the printing. What I claim is the applying a semi-translucent sheet on each side of a negative or positive, and retouching thereon."

M. Lambert's second patent of October 21, 1874, relates to the production of carbon prints, which involves less than half the manipulation necessary for silver prints:—"I take a glass plate and apply a greasy coating, and then a layer of plain collodion; after which I immerse in cold water, then apply the printed paper taken from the frame to the glass in the water, and remove them in contact with a slight pressure. Develope with hot water, when the picture will appear as a transparency. To apply the mount it is only necessary to pass the glass and card through a bath containing a solution of ten or fifteen per cent. of gelatine, and when dry removing from the glass. The same result may be obtained by developing on mica, and fastening on the back white or coloured paper. For an ornamental border I print in salts of silver, leaving a white space for the carbon print. I also claim lithographing borders on

albumenised paper, leaving spaces for the prints. I also claim retouching and intensifying the positive print after being transferred. To intensify I use 300 grammes of water, one drop of liquid ammonia, one gramme of sugar, and a few drops of permanganate of potash. After the plate is dried dust colours are applied to strengthen the parts wanted."

M. Lambert's third patent, May, 1875, is for printing-frames and a registering photometer, but these I consider of little importance. For ornamental borders he describes:—"I coat a chemically-clean glass with wax and cover with plain collodion, then with gelatine, and again with collodion; when dry detach from the glass. This forms a translucent surface upon which to lithograph any design to form a border or name to be used in printing."

Now this concludes, so far as I know, the patents of the Autotype and Lambertype on this subject, the first of which lapses in less than two years, and I now present to the Association the specification, which you can consider at your leisure.

In The British Journal of Photography for January, 1876, Mr. W. E. Batho, in an able paper, describes a number of processes in carbon printing.

In December, 1873, Mr. G. Croughton described to the London Photographic Society a method of working up negatives by straining tracing-paper upon both sides of the negative and touching thereon.

Now a patent to be valid must be original, and the whole process described and published six months after application. If the process have been previously published the patent is not worth the paper it is written upon. As Mr. Croughton has published the above process before the date of M. Lambert's patent it is now free to the public.

It is well known that patents are easily procured by all who can pay the fees. At the Patent Office no one seems to take the trouble of investigating whether the assumed invention be new or old. Pay the money charged and the patentee, if challenged, must fight it out in a court of law, so that patents are granted over and over again for the same invention. Instance the case of M. Lambert patenting the same thing as Mr. J. W. Swan did in 1864; that is, coating the glass with collodion before applying the carbon tissue. Again: we have M. Lambert copying Messrs. Mason's patent for the printing of lithographic borders or designs on albumenised paper, and leaving spaces for the picture. Over twenty years ago I patented a process for the transfer of transparencies from glass, &c., with plastic and other substances. Now that patent has been patented over and over again, so that no patent can be reckoned valid until legally tested.

At our last meeting I promised to give you a method for preparing carbon printing paper. As far back as 1861, when Mr. Blair and others were making progress in carbon printing, I made a number of experiments to find out the best colouring matter. Among others I tried lithographic writing-ink; also type and lithographic printing-ink. I found that the writing-ink made by far the finest compound to coat the paper with, and was quite as good as any I had ever used, giving bolder shadows and more graduated tints than that in general use. The writing-ink is usually composed of two ounces of soap, three ounces of wax, one and a-half ounce of shellac, one ounce of tallow, and sufficient gum and lampblack. I also found type and lithographic printing-ink, mixed in equal parts, to make a good colouring material. For the gelatine solution I take black lithographic and type ink and mix it to the shade wanted with coloured inks, and add a little printers' lye or ox-gall to the ink, which will cause it to dissolve in water. Lye is a solution of American potash, sold at the drysalters'. Or to the ink you may add a little more soap than is already in that composition, until it is soluble in water and about the thickness of cream. Strain through a cloth into a bottle, and put by for future use. This mixture might be sold by the photographic dealers, so that artists would have nothing to do but to add it to the gelatine and bichromate bath as required. Any printing-ink maker will make up the ink as wanted, either a lithographic writing-ink or otherwise; but the writing-ink I find by far the best, as the large amount of wax and shellac appears to retain the colouring matter better in suspension. Now steep clear glue in cold water for two hours. Dissolve in hot water, taking care that you do not make the gelatine too hot. Add sufficient of the ink to colour the gelatine solution. If wanted for immediate use add bichromate of potash or other sensitiser. If you wish to print quick use a strong solution for sensitising. I prefer a weak solution as giving better half-tints, but artists must judge for themselves as to the amount of each ingredient required, according to the kind of work to be done.

The paper (which should be good printing paper) may be coated by first damping and laying on a sheet of glass, the solution being poured from a bottle on the centre of the sheet and spread with a soft brush, taking care to avoid air-bells. After lying on a flat board till set hang it up in a dark place at night to dry, and it will be ready for use next morning. Carbon printing paper might be prepared in webs by any of the wall-paper makers, and sold at nearly the same price as wall paper, as it is composed of the same materials—that is, glue with any colouring matter added. The transfer paper could be run through the paper-makers' sizing-machine and alumed, as is usual in paper making, only coating with less water in the size. When the printing and mounting is simplified, so that prints may be produced as good and cheap as silver photographs, then, I have no doubt, we shall get tissue of a better quality and at one-tenth the present price.

I promised to show you a sample of carbon paper, but the time being so short for the writing of this paper, and the number of patents to go through so numerous (amounting to about 250) connected with photography before the date of the first of the Autotype Company's patents, I have been only able to overtake a few; but I have brought a sample of the colouring ink, which to get finely ground is the great feature in carbon printing. Aniline and other dyes have been used as a colouring matter, but from their evanescent nature are unfit for use. However, the sample I have brought you can try for yourselves, and if any artist call on me personally I shall be glad to give him any information in my power for making the same.

Before concluding I may state that my principal aim in this paper is to elicit discussion on the subjects treated, so that experiments may be made on every process tending to advance our important and beautiful art, that real progress may be made by the profession, and that all may share in a liberal way every advantage secured. John Urie.

Meetings of Societies.

EDINBURGH PHOTOGRAPHIC SOCIETY.

An ordinary meeting of this Society was held at 5, St. Andrew-square, on Wednesday evening, the 1st instant,—the President, Dr. Thomson, in the chair.

The minutes of previous meetings were read and approved, and Messrs. John Gowan, T. Wallace, James Walker, James Anderson, and Lindsay Howie were admitted ordinary members.

A paper by the Rev. J. H. Palmer, of Wallasey, Cheshire, entitled *Experiences in Working the Gelatino-Bromide Emulsion* [see page 113] was read, and listened to with marked attention.

Mr. Ross presented to the Society, in the name of Mr. Kennett, several prints, including a fine portrait of himself, from gelatine negatives, all of which were much admired as illustrations of the capabilities of the process. He (Mr. Ross) also stated that Mr. Palmer had, in his studio, prepared, exposed, and developed a number of the gelatine plates, and some of them were very fine. They were quite as rapid as wet collodion, and if they could be made as certain he should have no hesitation in abandoning wet collodion altogether.

Mr. Lessels had tried the gelatino-bromide plates, but had not succeeded. Possibly his failure might have arisen from unsuitable light in his dark room, or some lack of experience in manipulation. He was, however, very anxious to get really rapid dry plates for photographing interiors, and now that Mr. Palmer had given so clear an exposition of his method of working he should give it another trial.

The Chairman had studied with no little interest all that had been written about the process in question, and had procured some of the pellicle from Mr. Kennett, but he thought that some time would elapse before it would supersede the processes at present in use. Gelatine would be found more unmanageable than collodion, as it was so readily affected by variations in temperature—variations that were not always easily controlled. The outcome of his own experience was that the most thoroughly satisfactory results were got with the beer and albumen plates. No doubt they required a somewhat lengthy exposure, but that was fully compensated for by the certainty and beauty of the results obtained. While he admitted that the processes were slow, as compared with some others, he had often made plates sufficiently sensitive to give fine cloud effects in his landscapes.

Mr. W. Neilson thought the present running after rapidity in dry plates was a mistake. Unless they could be made absolutely instantaneous—not yet claimed for any dry process—a long exposure was often much better than a short one. He had more than once secured good results during a heavy wind with very long exposures; the trees, although moving very much, seemed always to return to the same place, and admitted of being impressed with considerable sharpness and definition.

Mr. Alexander Nicol spoke in favour of the beer and albumen process. He had employed it frequently and always with success, which was more than he could say of any other process, while his exposures varied from two to three minutes, which, he thought, was quite short enough for any ordinary purpose.

Mr. R. H. Bow thought there was one feature of considerable importance in the gelatine process which was being overlooked—the absence of the smell of ether and other volatile bodies so disagreeable to some operators; and he was of opinion that, other things being equal, this should be a strong recommendation to the gelatine.

Several other members spoke on the subject, and from the general tenor of the discussion the opinion seemed to be that the gelatine-bromide process possessed some advantages as well as some disadvantages, but there was, so far as was yet known, nothing in it likely to lead to its superseding the processes now in general use.

Mr. Turnbull showed two large prints of excellent quality, by Mr. McLeod, of Newark, which were much admired.

On the motion of Mr. Ross hearty votes of thanks were awarded to the Rev. Mr. Palmer for his admirable paper, and to Mr. Kennett for his contribution to the Society's album, and the meeting was adjourned.

GLASGOW PHOTOGRAPHIC ASSOCIATION.

A meeting of this Association was held on Wednesday, the 1st inst.,—Mr. John Stuart occupying the chair.

After the transaction of routine business,

Mr. John Urie read a paper on *Carbon Printing Paper* [see page 115].

Mr. Gilfillan considered that the paper was a valuable aid to the history of carbon printing, and evinced much research.

Mr. Dodds wished that Mr. Urie had shown some tissue and a few pictures, as such would have been very satisfactory, for it would have enabled the members to judge of the value of his proposals.

Mr. Spencer regretted that there were not present a greater number of those who had bestowed attention to carbon printing, as the discussion would have been likely to elicit a greater number of facts. He considered that it would be well for them to look into the merits of the carbon patents in order that they might see how much of the process was not really open to the public. If a man, however, devoted a large amount of time, and mastered a process which he believed was new, and then came and taught them what they were not able to do before, such a man deserved to be paid for such tuition. The question of carbon printing and permanency was of the greatest importance, and he thought that the Association ought to devote an early evening to consider the whole question. (This proposal was agreed to.)

The Chairman said that anything tending to the improvement of carbon printing was of interest to him, and he was much pleased to find that Mr. Urie had brought up the subject of the preparation of carbon tissue. The work which Mr. Urie must have had in collecting so much information as to the patents in carbon printing no one could fully appreciate but those who had tried. He (the Chairman) had been a carbon printer since the year 1866 or 1867, and had taken a lively interest in all that concerned carbon printing. About the year 1867 he, along with their worthy Secretary, visited the printing works of Mr. J. W. Swan, at Newcastle-upon-Tyne, and was delighted with the work he there saw in hand. The courtesy of Mr. Swan to them on that occasion would be long remembered. He believed that he would have purchased the patent for Glasgow at that time, but there was some difficulty as to the preparing of the tissue; that is, as to Mr. Swan being able to secure it by patent. At that time he kept it as a trade secret, for they were not allowed to see it manufactured; had it been patented there is no doubt but he would have shown it also. There was one great trouble with the process as worked by Mr. Swan, namely, the use of india-rubber and benzole. The smell was so great that it was enough to drive all trade from the place. Again: a large press had to be used to unite the tissue and the temporary support. When visiting London at one time, he (the Chairman) was informed that a Mr. Edwards was printing in carbon by a process which was very simple, and he paid him a visit. He was much pleased with the result, for he saw there, for the first time, carbon prints by single transfer. About that time Mr. Spencer was preparing tissue for the use of photographers, and since the time he joined the present firm they had made considerable improvements in carbon printing, and, he was quite sure, at a great outlay of hard cash, not to speak of time. The liberal policy they had followed in time past had done much to encourage printing in carbon. He thought it was to be regretted that they had now changed that liberal policy to one more conservative in its bearing towards photographers. However, time would show them that they were wrong if they did anything to prevent the spread of carbon printing. When he (the Chairman) told the members that there was carbon tissue made by the mile in Glasgow some of them might be astonished, but such was the case. It was not used to print pictures on, but to make into patent leather. He thought if the demand was great for carbon tissue the company might be induced to make it suitable for photographers. However, he believed the Autotype Company was composed of too good business men to allow anyone to undersell them, and the time was not far off when tissue would be half its present price. He now came to the Lambert patents. When the advertisement appeaed regarding this new mode of printing in carbon, and the great accounts as to the pictures produced by it, he could not wait, but set off to see for himself, and soon found himself face to face with M. Lambert, at Greenwich. He showed him (the Chairman) small and cabinet pictures in carbon, and he assured the members he thought he was tricked, and that they were silver prints with a collodion film over them, and said so. "Ah! you are not the only one who has thought so," was the answer. After a long conversation he applied to have the process and paid for it, and for the first time he saw carbon prints produced which few could tell from the finest silver prints. Patent or no patent it little mattered to him, for he could with very little extra trouble produce pictures which he was able to inform the public were permanent. There were a number of people who took a delight in picking holes in everything new which was brought out; and there was some cause for it, for they had often been bitterly "sold." That, however, was their own fault; they should see what they were buying, and not be tricked by a "glib-tongued" traveller. He was sorry his remarks had been so crude and scattered, for he could have wished to have said much more to the point; but the days of silver printing were numbered, so photographers should look out. Before sitting down he had much pleasure in proposing a hearty vote of thanks to Mr. Urie for the paper he had read, and trusted Mr. Urie would allow it to be published, so that they might be able to look over the formula he had presented and give it a trial.

The vote of thanks was heartily agreed to.

Mr. Robertson said the trip to Newcastle-on-Tyne, which the Chairman had referred to, had given him great pleasure, and the very handsome manner in which Mr. Swan and Mr. Mawson had received them was a constant pleasure to look back upon. Mr. Swan had shown them everything with the utmost kindness, and he believed the only thing he did not show was the manufacture of tissue. He gave them some prints which are as good to-day as they were at the time.

After a few remarks from Mr. Urie, and a cordial vote of thanks to the Chairman, the meeting was brought to a close, all present expressing themselves pleased with the proceedings.

LIVERPOOL AMATEUR PHOTOGRAPHIC ASSOCIATION.

The monthly meeting of this Association was held on Tuesday evening, the 29th ult., at the Free Public Library, William Brown-street,—the Rev. H. J. Palmer, Vice-President, in the chair.

The minutes of the previous meeting were read and confirmed.

The Chairman exhibited an "excelsior" camera, attached to which was a box holding twelve prepared plates. By a clever arrangement the plates were lifted as required into the camera, registering at the same time the plate used. The camera, with its various ingenious arrangements, was examined by the members with much interest; but it was thought that, for large cameras, some special means to prevent vibration would have to be taken in windy weather.

Mr. Ellerbeck exhibited a collection of lantern slides of seaweeds and some carbon transparencies taken on talc. He thought it would be advisable that the Association should have a collection of lantern slides which the members could borrow for private use on application to the Secretary. He was sure that donations to the collection would be readily given, and he should be happy to present to the Association some slides for that purpose.

Mr. E. Phipps exhibited some plates made with washed bromide of ammonium emulsion prepared eighteen months previously, which showed that the emulsion could be relied on for keeping.

The Chairman exhibited some photographs of his apparatus used in preparing gelatine plates.

The meeting was shortly afterwards adjourned.

Correspondence.

March Meeting of the Photographic Society of France: the Forthcoming Photographic Exhibition at Paris; Collotype Proofs by M. Geymet; Demonstration of Fatty Ink Transfer and Printing by M. Geo. Fortier; Carbon Proofs; Novel Swinging Back.—Visit to M. Rousselon.—Mr. M. Carey Lea.—A Syphon.—Photochromy.

The Photographic Society of France held its monthly meeting on Friday evening, the 3rd inst.,—M. Peligot in the chair.

After the election of new members a conversation took place respecting the exhibition to be opened next May under the auspices and patronage of the Society. I take this opportunity of reiterating the invitation given in a former communication to English photographers and amateurs to take part in that international struggle in the progress of art and science. If we can judge by the alacrity with which this invitation of the French Society has already been responded to, the exhibition bids fair to surpass all others of its kind in France, for it may be supposed impossible to compete with Philadelphia.

Our friend, M. Davanne, as well as many others of the most influential of the Society, are doing their best and spending their energies to arrive at this result, and we are certain that success *will* crown their efforts. One of the principal objects which these gentlemen have in view is to prove by the forthcoming exhibition that photography renders great service to science. To do this they have appealed to all the government institutions for information as to the use they make of photography in their establishments, asking, at the same time, for specimens to be exhibited. It is to be hoped that English photographers will not be behindhand in responding to the friendly invitation of the Photographic Society of France, and that they will hasten to take part in that amicable contest for fame which will aid to cement more firmly the bonds of union between the two countries.

M. Geymet presented the Society with a large collection of fatty-ink proofs, which were very much admired. Collotype and the carbon processes are decidedly making their way slowly but surely in France; in fact, the whole evening was absorbed in viewing proofs made by those processes.

M. George Fortier, another champion of fatty-ink printing, demonstrated before the Society how he manipulated in order to obtain a transfer upon stone or zinc, and from thence the indelible *proof* upon paper.

M. Braun presented a very fine collection of carbon proofs to the Society, being the reproduction of the most celebrated pictures in the Museum of the Hague.

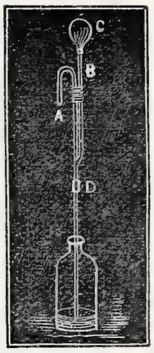
M. Roger made a presentation to the Society of a novel means of obtaining parallelism of the image on the focussing-glass in travelling cameras. Everyone knows that when the camera is pointed in an upward direction it is found necessary to bring the back in a perfectly vertical position, or the lines of a building will be distorted. This is generally done by a double frame, to which is attached the dark slide by means of pivots. This is cumbersome when travelling, and M. Roger has replaced it in a very ingenious manner. The frame which carries the dark slide is mounted by means of pivots upon two brass pillars, in form not unlike those which support the ordinary swinging looking-glasses for bedrooms. These two pillars are themselves imbedded in a flat piece of wood attached to the base-board by means of a screw in the centre. Thus the dark slide has two tilting motions—one in a perpendicular, and the other in a horizontal, position. The whole apparatus has the advantage of being very light.

I made it a pleasing duty to pay a visit last week to the celebrated firm of Goupil and Co., having received an invitation from M. Rousselon, the intelligent manager of the works. I left Paris for Asnières—a small and pleasant town in the environs of Paris, which passed through such a fiery ordeal during the late insurrection in Paris. The large establishment of Goupil and Co. is not far from the celebrated Château de Becon, which became the "*point de mire*" of the troops, and, in consequence, the cause of ruin and desolation to the environs. On arriving at the manufactory I was received with great courtesy by M. Rousselon, who conducted me through the various workshops under his superintendence. I admired very much the excellent results which the Woodburytype process had acquired in the hands of M. Rousselon; the proofs sent out by him are the admiration of the world. But it is, above all, in his photo-engraving that he has become a master in his art. This is natural, as it is his secret. I did not press for an explanation. He informed me, however, that the whole secret lay in a discovery he made of a chemical substance which crystallises under the influence of light, and in consequence the high lights are, as it were, blocked by a great number of large crystals, which become smaller and smaller according to the quantity of light which penetrates through the negative. I submitted to M. Rousselon the desire of the Editors to have a few specimens for Mr. M. Carey Lea, who had expressed a wish to secure some for his collection. M. Rousselon agreed to do so, and said he would send me some specimens in a few days.

Apropos, I am much obliged to my colleague, Mr. Lea, for his kind reference to the observations made on his process in one of my communications to The British Journal of Photography. Certainly I will take an early opportunity of explaining to the gentleman interested the cause of his non-success, and I have no doubt he will succeed by substituting cobalt chloride for cupric chloride. In quoting the page where the Editors speak of introducing the copper salt after the emulsion had been made, I committed a blunder. It is not page 182, but 181. On the 33rd line of that page the Editors say—"The cupric chloride was then added," &c.

I gave, in The British Journal Photographic Almanac for 1876, the description of a large tray for sensitising plates. Although that tray requires eight or nine quarts of silver solution at a time, I did not explain how I emptied it, as I supposed syphons were well known in England; but I was convinced of my error by perusing your contemporary of the 4th of February (which journal had been sent me by one of my Paris friends, a late subscriber to the publication). In that number I saw a very elaborate description of a syphon for "emptying silver baths," &c. An india-rubber bottle is put on to the longest leg of the syphon, and the shortest leg put into the bath. The bottle is squeezed to expel the air, and is then allowed to take its original form, which causes the solution to run over the top of the vent tube. To quote the author:—"But to prevent the solution entering the rubber bottle press the tube with the finger and thumb of the left hand. Withdraw the rubber bottle from the tube, and run the solution into the stock bottle or bottles." The author of this admirable invention in his modesty has not made it the subject of a patent, "*pro bono publico.*" In the syphon described it is not difficult to see many defects. Firstly, with the greatest care it is impossible to prevent here and there a portion of the liquid rushing into the india-rubber bottle or soiling the fingers; secondly, the exhausting bottle must be made with vulcanised india-rubber, as well as the tubes, and the effect of sulphur in a silver solution is well known.

I will now give, for the benefit of my readers, a description of the syphon employed in my laboratory for many years, in which those defects are overcome. The syphon is similar in construction to the one described, only a small tube B is joined to syphon A, on the top of which is the india-rubber bottle C, quite out of the reach of the silver solution. To facilitate the removal of the syphon a joint is made at D with gutta-percha, not india-rubber. To work the syphon plunge the long end into the stock bottle (placed on the ground) in which there has been left purposely a small quantity of the solution. Put the small end into the tray. It suffices to squeeze the air bottle in order to expel the air. Open the hand and immediately the syphon is at work. Should it be necessary to decant the solution from a deep bottle join a piece of glass tubing upon the short stem by means of gutta-percha tubing.



Photochromy is making its way, and proofs can now be seen on our Boulevards. M. Liebert, the well-known American photographer, was one of the first to put some into his show-window on the Boulevards des Italiens. These proofs drew crowds round them and were admired by all. In what way M. Vidal operates so as to obtain such results is unimportant to me; whether he does it by the superposition of gelatine films, each coloured in a different manner, or by the colours being placed under a transparent film by mechanical means, I am indifferent. I only look to the results obtained, and these are at once practical and beautiful.

M. P. Cunliff Owen, Esq., Director of the South Kensington Museum, visited the establishment of M. Vidal, in company with Mr. George Berger, and he expressed himself completely satisfied with the results obtained. He appreciated immediately the great value of this new means for the dissemination of works of art, &c. The opinion of such a *connoisseur* is not without weight, and will, no doubt, facilitate the adoption of photochromy for the reproduction of all the objects in English museums with the same ease as was granted for those of France.

The Photographic Almanac for 1876, compiled by M. Leon Vidal, is to hand. It is a beautiful little work, full of information, and should find a place in every studio. E. Stebbing, *Prof.*

3, *Place Bréda, Paris, March* 6, 1876.

OXYHYDROGEN EXPLOSIONS.

To the Editors.

Gentlemen,—With reference to the gas-bag explosion mentioned in your last number, and which is spoken of as "mysterious," it may, we think, be useful, as tending to allay groundless fears of the possibility of explosion of gases occurring spontaneously, or by concussion, to state that there really is no reason to regard the cause of the late explosion as a mystery.

The facts are simply these:—Some person connected with a music hall ignorantly or carelessly, or both ignorantly and carelessly, filled up with coal gas a gas-bag which had been used for, and still contained, oxygen, and then sent it through the streets by a boy of thirteen, who, there is no reason for doubting, lit a match, and (by way of experiment) set fire to the gas, which proved to be a highly-explosive mixture. This is, we feel certain, the simple truth of the matter.

Although our name is mentioned in the account of the accident, it must be understood that we had nothing to do with it.

This is another instance to be added to the rather long chapter of gas-bag accidents arising from the mistake of using the wrong bag.

It makes one tremble to think of the terrible consequences that might have followed if, after the mistake in filling the bag had been made, it had not been blown up in the street by the boy, but had been used, as was intended, in the concert hall. Of course, nobody who knows what he is doing ever now uses the mixed gas in one bag; and we trust that comparatively few use the two gases even separately, both in bags and under pressure. Under the last-named conditions there are two dangers—one arising from mistake through carelessness, and resulting in the admixture of gases in process of filling the bags, as in the case above mentioned; and one the result of accident, and arising in event of the pressure on the two bags being *very* unequal. In this case there happens a transference of gas from one bag to another—from the bag under the heaviest pressure to the bag under less pressure; and this, you will see, results in a dangerous state of things. But *by taking the coal gas from the main, and using it in what is called a "blow-through jet," and employing only one gas in a bag, and that gas oxygen, there is no danger whatever.*—We are, yours, &c., Mawson and Swan.

11 *and* 15, *Mosley-street, Newcastle-on-Tyne,*
March 6, 1876.

"ORGANIFIED PYROXYLINE."

To the EDITORS.

GENTLEMEN,—That "history repeats itself" may be regarded as axiomatic. In your issue of January 6, 1871, a certain gentleman referred to certain communications from Colonel Stuart Wortley, which the latter flatly denied having made. To put it mildly, I suppose the ambiguity of the language employed on the occasion justified both gentlemen in each putting his own construction on the same; hence I would venture to reiterate that impartial judgment cannot be given in the matter of the "organified pyroxyline" until we hear from Mr. J. W. Gough, notwithstanding the letter Colonel Wortley holds.

From the tone of Colonel Wortley's remarks I cannot help thinking he has misunderstood the object of my letter. I did not wish to refer to the ability displayed in originating "organified pyroxyline," but to something infinitely beyond it, and which should be held in greater esteem by all men than the most brilliant displays of genius, viz., the administration of justice.

The absence of such administrative ability Colonel Wortley has, ere this, found occasion to deplore, and so likewise has,—Yours, &c.,

March 4, 1876. W. E. BATHO.

EXCHANGE COLUMN.

Two backgrounds, in flatted oils, $8\frac{1}{2} \times 7$ feet, mounted on roller and batten, landscape and interior, will be given in exchange for a 10×8 water-tight bath, in case.—Address, W. R. MCDOWALL, Stranraer, N.B.

Tissandier's *Photography* offered for the *Silver Sunbeam;* also, Ross's 8×5 doublet for Tench's quick-acting No. 4 cabinet lens or any similar good lens, or for Darlot's universal lens, No. 2 set.—Address, S. ARLIDGE, photographer, Mount-pleasant, Hettering-road, Northampton.

I have a pair of dissolving view lanterns, three and a-half inch double condensers, two large gas-bags and pressure-boards, apparatus for making oxygen gas, and five dozen mixed slides, which I will exchange for a good large lens and camera.—Address, LOUIS GUMPRECHT, photographer, 11, Cannon-street Road, London, E.

ANSWERS TO CORRESPONDENTS.

☞ *Correspondents should never write on both sides of the paper.*

W. MACKAY.—Received. Thanks.

S. H.—Benzoin is soluble in alcohol.

"OUR EDITORIAL TABLE."—In our next.

AMATEUR.—The bath is beyond "doctoring." Precipitate the silver by means of chloride of sodium and sell it to the refiners, thus making a new bath out of an old one.

T. J. LLOYD.—1. The sloping side-light proposed by you should answer quite well.—2. The window being directed to the south will necessitate the use of glass that has either been ground or very much frosted.

R. A.—We cannot suggest any way by which you can get rid of the markings caused by the rubber solution. Try the effect of a high degree of heat applied to the plate. Such markings are unknown in our own experience.

JOHN HAZLEWOOD.—The paste to which you allude is composed of gelatine dissolved in a minimum of water, methylated spirits of wine, scented with oil of lavender, being then added. The best proportions will be ascertained by one or two trials.

TANGYE BROTHERS.—If a special agreement was made with respect to the negative, and a definite charge made for it as distinct from that made for copies, it will then, we imagine, become the property of the firm for whom the work was executed.

A. S. G.—The latter part of the patent is undoubtedly good in itself; but before it could be valid, from the patent-law point of view, the former portion would have to be "disclaimed." As the patent stands at present any or all of the invention may be used by the public.

COMMANDER, R.N.—By mounting the lenses two inches apart the equivalent focus will be eleven and a-half inches. The picture will be quite free from distortion. To cover an 8×6 plate sharply use a diaphragm having an aperture of about half-an-inch.

W. BOYD.—The dimensions of the gallery will be quite suitable. Although there is no necessity for lining the building, yet such lining will conduce greatly to the appearance of the studio. This, however, is a matter of taste; the quality of the pictures will not be affected either by its presence or omission.

F. R. BLACK.—Hydrochloric acid, when added to the bath, will render the silver solution quite acid by the liberation of nitric acid. The addition of the hydrochloric acid causes an immediate formation and deposit of chloride of silver, and the nitric acid with which the silver was previously united is thus set free.

G. H. BONE.—We are quite familiar with the crystallisation of hippuric acid, and have frequently observed the great diversity of forms assumed by the crystals. The best way to produce circular crystallisations is to dissolve the acid in absolute alcohol, place a drop upon a warm glass slide, and suddenly blow the warm breath upon it before it has had time to crystallise.

C. H. F. C.—1. The delay may have been caused by illness or temporary absence from home; the gentleman named is certainly not a "myth."—2. There is, doubtless, a clerical error in the proportions, but fortunately it is of little consequence at that particular stage of the operation. We shall shortly have an article on the subject.

T. P. P.—1. Two thicknesses of calico will be quite enough. Let the outer cover be black, and the inside one yellow.—2. There will be no difficulty in your obtaining such a lens. What size or of what focus is it wanted? You will, of course, be aware that the manufacture of such lenses has been discontinued for ten or twelve years.—3. There is no remedy for the bronze-powder nuisance.

YOUNG JOHN.—The tannin process is an exceedingly simple one, and you may with great advantage devote your first attempts with dry-plate work to that process. Make use of the collodion and negative bath you are at present using, and proceed precisely as if about to take a negative by the wet collodion process until the plate is removed from the bath, when it must be subjected to a good washing in water, and have a ten-grain solution of tannin poured two or three times over its surface until every portion of the film has been permeated by it. If the washing be imperfectly effected red stains will appear. The plates are now dried, and will keep good for a long time. If you give this process a fair trial you will not fail to succeed in producing good negatives, provided the artistic element is present in you.

CAPTAIN TAIT.—If you mean the "pantascopic" camera, then we can assert its capability of producing negatives of a degree of sharpness sufficient to bear being magnified three or four diameters. This may appear strange, when it is considered that both camera and sensitive plate are in a state of motion during the whole operation; but, owing to the excellence of the fittings, the progressive motion is smooth and without a jar. A matter which is greatly in favour of the sharpness is that of the axial pencils of the lens alone being used—at any rate, all along the line of the centre of the picture from one end to the other; and, owing to the total absence of oblique horizontal incidences the lens works at its very best, and can be used with a much larger aperture than if it were employed for producing an ordinary picture in a camera of the usual kind.

BORDINIER.—We do not choose to enter into the whole matter arising out of your questions, nor, indeed, will it prove of interest to any beyond a fractional portion of our readers. However, we give a definition which ought, we think, to satisfy the desires of yourselves and friends. The terms "actinism" and "achromatism" imply different things; by the former is meant the union or coindence at the focal point of the yellow and violet rays—the visual and the chemical. If the red and the green rays be combined the term "achromatism" is that which is usually applied. A lens may be achromatic—that is, it may give an image free from colour—and still not be "actinic;" an excellent instance of this is to be found in the object-glass of a high-class telescope, which will produce an image very fair to look upon, but which would not give a sharp photographic image at the point of its maximum visual sharpness. This want of coincidence is caused by what is termed the "irrationality of dispersion."

ST. OLA.—The casket miniature, which was introduced by Mr. Henry Swan, was an exceedingly ingenious method of showing a figure in all the solidity of life. A coloured miniature was represented as being placed behind a square plate, or, rather, a cube of glass, of small dimensions, and when viewed with only one eye the portrait was a simple miniature, and nothing more; but when examined with both eyes it was seen to assume stereoscopic solidity, causing much surprise to the spectator. This was produced by the cube of glass being composed of two rectangular prisms, there being a duplicate picture of the one in front of the spectator in one end or side of the cube, and which could only be seen by one eye, and it was by the union of the two pictures that the stereoscopic effect was produced. The effect was both surprising and excellent; but, so far as we know, there is no one who now produces such portraits, and this is to be regretted, for the method in question was most excellent for showing a portrait in true stereoscopic relief without a stereoscope.

☞ Editorial Communications should be addressed to "THE EDITORS"—Advertisements and Business Letters to "THE PUBLISHER"—at the Offices, 2, York-Street, Covent Garden, London, W.C.

NEW CATALOGUE.—We have received from Messrs. Watson and Son a copy of a new edition of their catalogue of new and second-hand lenses and cameras. It contains a very extensive list of articles by the best makers, and we recommend it as a *brochure* likely to be very useful to photographers.

METEOROLOGICAL REPORT,

For the Week ending March 8, 1876.

Observations taken at 406, Strand, by J. H. STEWARD, Optician.

THESE OBSERVATIONS ARE TAKEN AT 8.30 A.M.

March.	Bar.	Wind.	Wet Bulb.	Dry Bulb.	Max. Tem.	Min. Tem.	Remarks
2	29·88	W	41	44	53	39	Dull
3	29·75	W	50	52	57	44	Dull
4	29·74	SW	43	46	52	43	Bright
6	29·61	NW	49	53	57	43	Dull
7	29·74	W	39	42	49	38	Bright
8	29·75	W	44	46	—	38	Dull

CONTENTS

THE BRITISH JOURNAL OF PHOTOGRAPHY.

No. 828. Vol. XXIII.—MARCH 17, 1876.

ORGANIFYING GELATINE EMULSIONS.

Gelatine may now be said to have taken an established place in photography in connection with dry plates, and whatever may be the shortcomings or inconveniences of the gelatine emulsion it would be absurd to deny that it possesses certain advantages not hitherto attained with collodion. The shortcomings, as we have remarked upon previous occasions, consist principally in the length of time and the care required in drying the plates, and also in the fact that the emulsion is not endowed with very extended keeping qualities; but, as our readers will have gleaned from the interesting article by the Rev. H. J. Palmer in our last number, these difficulties are reduced to a minimum by the adoption of a methodical course of treatment such as that described by the author, or may, indeed, be said to disappear entirely. But as regards sensitiveness the gelatine emulsion, so far, appears to be far in advance of any dry collodion process extant.

But, although upon such a comparatively short experience with this form of emulsion so great a degree of excellence has been already attained, we see no reason to suppose that the maximum point has been reached; on the contrary, we think, that if the same amount of research devoted to collodion processes be extended to gelatine a much higher state of perfection may probably be arrived at. In connection with collodion emulsions the object has been to develope as far as possible the so-called organic reactions with the view of increasing the sensitiveness of the films, as well as the density of the image resulting therefrom. In the case of a gelatine emulsion it might be supposed that the organic element would be present to the utmost extent necessary; but though, as we have said, in point of rapidity this emulsion is in advance of others, it is evident from the numerous complaints as to the difficulty in obtaining sufficient density that in the latter respect something is wanting.

It is well known that plates prepared from an ordinary collodion emulsion—that is, from an unwashed emulsion—and afterwards treated with an aqueous organifier are capable of producing images of any required density, even to absolute opacity; but in the case of a washed emulsion this is not so easily accomplished. The range of substances which may be introduced into such an emulsion is greatly narrowed by the solvent powers of the ether and alcohol, so that very many substances which may be used with the greatest advantage in the shape of an aqueous preservative are wholly inadmissible in the emulsion itself. Certainly Mr. M. Carey Lea's plan of treating the pellicle in the course of its preparation with such an aqueous solution is intended to obviate this difficulty; but, though it produces in many cases a marked improvement, the effect is not nearly so great as when a similar solution is applied to a thin collodion film previously washed. This is, doubtless, owing partly to the inability of the organifier to thoroughly penetrate the whole of the thick mass of pellicle, and partly, again, to the removal of a portion of the organic matter during the operation of washing. It is only reasonable to suppose that the introduction of the organic substance directly into the emulsion would secure a more thorough blending of the materials and tend towards more complete action—a supposition which is borne out in practice.

Now gelatine affords much greater facilities for the introduction of various organic matters into the emulsion to act simultaneously with the silver nitrate, and to produce any desired effect. This matter was specially brought to our mind by the postscript to Mr. Palmer's article last week, in which he states, upon the authority of Mr. Kennett, that the substitution of mild ale for the water used in forming the gelatine emulsion results in the production of negatives of great beauty and brilliancy. Various sorts of ale have long been known as favourite preservatives with many amateurs, and the introduction of that beverage into the emulsion is at least equivalent in effect to its application to the washed surface of a sensitive film. We say advisedly "at least equivalent," for it is obvious that to a certain extent the action is different in the two cases. In the case of a washed film the effect of the organifier is more or less confined to the surface, the extent of its action being dependent upon the nature of the film and the length of time it is allowed to act; while if the same substance be dissolved in the emulsion it is brought at once into uniform and intimate contact with every particle of sensitive matter. According to some theorists the image is said to be formed entirely upon the surface of the film, in which case the thorough permeation of the organifier would be of little importance. With this view, however, we do not agree, more especially with alkaline development; on the contrary, we hold strongly to the opinion that the film should be equal throughout its entire thickness. Then, again, unless the washed film contain at least a trace of free silver at the time of its treatment with the preservative solution, the chance of the formation of an organic silver compound is much less than when the organic substance and the free silver are co-existent in solution on the emulsion.

These remarks will serve to define the action of various organifiers under different circumstances, such as for instance in the presence of free silver and the contrary. We may as well state our opinion, that we do not consider it probable that any organic addition to a gelatine emulsion will be found to increase its sensitiveness; but we do consider that such additions will be found to add materially to the density obtainable, while in many cases, no doubt, the sensitiveness will be diminished rather than otherwise. Such we have almost invariably found to happen with collodion emulsions. It will be noticed that the employment of mild ale in the gelatine emulsion is not claimed to confer any greater sensitiveness, but merely increased brilliancy. We have remarked previously that organic substances do not, as a rule, act as accelerating agents, but more or less as retarders of sensitiveness, and that the different degree of rapidity obtained by using various preservatives depends upon the greater or less retarding influence they exert upon fogging and development; the three influences we consider as distinct. Gelatine we look upon as a fog restrainer, possessing at the same time but little action in retarding either development or sensitiveness. What, then, is the most suitable substance to employ in order to increase the density of the image without materially affecting rapidity of action?

Of all the more generally-used preservatives tannin is perhaps the one, *par excellence,* which tends to the production of density when used with bromide or bromo-iodide of silver films. It is at the same time, however, a retarder of sensitiveness and a most powerful restrainer

of development. It possesses a peculiar action upon the silver haloid quite independently of the presence of free silver, with which—unless a restraining agent, such as a strong acid, be used—it forms a dense brown precepitate of tannate of silver; but that most sensitive plates may be prepared by its means is amply proved by the results of Major Russell's rapid tannin process, in which the tannin is removed from the film after having produced the desired effect. We have used it with tolerable success in the formation of a washed emulsion, employing it in the preliminary stage, in the presence of free silver nitrate, together with nitric or citric acid to prevent the formation of the tannate of silver. The results as regards density were all that could be desired, but the sensitiveness of the plate was not altogether satisfactory; unfortunately, still, its use in connection with gelatine emulsion is quite out of the question owing to its coagulating effect upon the latter substance. An effect almost identical with that of tannin, and of which we shall speak farther on, may, however, be produced by what we may call "artificial" means without rendering the gelatine insoluble.

A somewhat analogous substance frequently employed as an ingredient in preservative solutions is gallic acid. This is similar in many of its properties to tannin, but it has not the same effect as the latter in rendering the gelatine insoluble. It exercises a powerful reducing action upon the soluble salts of silver, and therefore can only be employed in the presence of free acid. The tendency is to give great softness and a peculiar non-actinic colour to the image without materially affecting the sensitiveness; employed in many of the collodion processess it is most valuable.

Gum arabic is a very favourite organifier, and gives—especially in conjunction with the last named—negatives of great beauty with extremely short exposures. As it appears to be nearly, if not quite, neutral towards silver nitrate it is difficult to explain its action; and, being quite insoluble in alcohol, it is not possible to introduce it into a collodion emulsion except in the manner described by Mr. M. Carey Lea, who speaks very highly of it. As it is perfectly soluble in water and miscible with gelatine it offers in conjunction with gallic acid a very suitable organifier for gelatine emulsions. Infusion of coffee gives very fine results, both alone and in conjunction with other substances, the resulting image being dense and non-actinic in colour; and, producing no insoluble deposit with silver nitrate, it is peculiarly adapted to the purpose of which we speak.

Albumen, which is universally considered to give the most generally perfect results of any substance employed in connection with dry plates, is unfortunately of little use in washed emulsions, whether of collodion or gelatine. It is instantly precipitated by alcohol, hence it is impossible to add it to a collodion emulsion; while, even when employed according to Mr. Lea's method, it is said by some that the albuminate of silver formed will not re-emulsify. In a gelatine emulsion it is immediately coagulated by the addition of silver nitrate, and if present in any quantity forms into clots, which must be filtered out before the emulsion can be used, thus robbing the latter not only of any possible good effect, but also of a portion of the silver used in sensitising.

A very excellent organifier, and one which we should specially recommend in this connection, consists of gallic acid and grape sugar in combination. As is well known to chemists tannin, when long exposed to the atmosphere in the presence of moisture, splits up into gallic acid and grape sugar, and, curiously enough, these two substances when employed in certain proportions as an organifier can be made to produce the same effect as tannin; or by altering the proportions of one or the other any desired effect of softness or density may be secured, gallic acid, as we have said, tending to softness, while an opposite effect is produced by the glucose. Both of them exercising a reducing action upon silver nitrate it will be necessary to employ free acid in order to prevent decomposition. For this purpose we should recommend either nitric or acetic acid. These substances being perfectly soluble in water may be dissolved at the same time as the gelatine, taking care to add the acid before the silver.

So far we have spoken only of the addition of the above-mentioned substances to the gelatine emulsion, or, in other words, in the presence of free silver nitrate. It is, however, possible—in some cases, perhaps, desirable—to apply the organifier after the silver has been converted or removed. This may be conveniently done by pouring out the sensitised pellicle, allowing it to set, and soaking in the preservative solution in the same manner as in removing the soluble matter, washing finally in pure water.

CARBON PRINTING.

In our recent article on pigment printing we had no intention of raising doubts as to the permanency of such work when properly carried out, but merely wished to direct attention to certain probable causes of fading that might be found to arise where insufficient care had led to the selection of unsuitable colouring matter, or where, through faulty manipulation, traces of the chromic salts were left in the film or the hygroscopic qualities of the gelatine had not been removed.

If we may judge, however, from a large mass of correspondence, we must believe that there are not a few who have misunderstood our object, and placed upon the article a construction which we most certainly did not intend, and who seem inclined to demand in pigment prints a degree of permanence altogether unreasonable.

The question of permanence is really one of degree, and we should hesitate to say that even the most permanent of all photographic productions—enamels burnt-in on porcelain or copper bases—will resist the climatic influence of centuries, much less the pictures produced by the most unchangeable pigment held in position by an organic support. No doubt the most ardent advocate of carbon printing will readily admit that his productions will be more or less affected by the force of time, and that they will even be visibly acted upon by a comparatively limited number of years' exposure to brilliant sunlight; but works of art are not generally subjected to such trying ordeals—at least by those who put any value on them.

We have never cared to join in the crusade now more than ever popular against silver prints in general, on the ground of their alleged certainty to fade, as we believe that, with proper precautions both in their preparation and custody, they will remain "things of beauty" for a very long period. We have had in our possession prints that were fixed in the old hypo. and gold solution the whites of which were as pure, and the detail and half-tones as perfect, as when they were mounted some twenty-three years ago. But we, nevertheless, are heartily glad to see the present almost universal interest that is being manifested in carbon printing, and gladly welcome every fresh adherent to the ranks of those who are working earnestly to make it as permanent and perfect as possible. However permanent a silver print may be there is something about a carbon print that, *cæteris paribus*, must always give it a preference—a something, perhaps, more easily felt than described, but still a something whose influence prevails to a much greater extent than may be generally supposed.

Since writing our former article—in which, it will be remembered, we stated that certain prints on which we had experimented swelled up on being moistened with water, and that the pigmented gelatine was easily detached by slight rubbing—these experiments have been continued on a more extensive scale, and with, we are glad to say, a tolerably satisfactory result. Of a large number of prints collected from both professional and amateur printers, less than five per cent. showed this objectionable feature even after being soaked for three hours in cold water, and most of them were but little affected by an immersion in warm water, showing that the alum or other salt had done its work well. When, however, the water was raised to the boiling point all were more or less affected, and the tissue could be easily rubbed off in patches. Of course no sane collector of prints would ever think of putting any of his specimens to such tests, but still the more thoroughly insoluble the tissue can be made the better will be the result as regards permanence.

There are many substances besides alum that coagulate gelatine, with some of which we are carrying out experiments, and to which we shall on a future occasion refer; but, meanwhile, we would suggest a

trial of some of the chromic oxides or their salts. We learn from *La Photographie et la Chimie de la Lumiere* that Dr. Jacobson succeeded by a mixture of potassium bichromate and glue in so fastening the edges of vegetable parchment that after exposure to light it stood the action of boiling water, to which, in the shape of artificial sausage skins, it was subjected during the Franco-Prussian war. It is just possible that a modification of this treatment would so thoroughly harden the gelatine of a carbon print that, after long exposure to the smoke and dust of an ordinary house, it might be readily cleaned by a good boil.

While carrying on our experiments, a few days ago, we received from a correspondent at a distance—an experienced carbon printer—a very fine print of a somewhat peculiar but really attractive tone or colour. It was a rich black just softened by a brownish tint, and from the treatment it had received our correspondent asserted that it must be quite permanent. It had been made from the "special portrait tissue, brown tone;" and amongst other experiments which he had tried, with a view to ascertain how far the colouring matter was of a permanent nature the print in question had been immersed in a pretty strong solution of hydrochloric acid. The print has lost nothing of its detail—is, in fact, a charming picture of a pretty little girl, faultless as to colour, and we have no hesitation in saying that it is as permanent as anything on paper can ever be.

RECENTLY PATENTED INVENTIONS.

No. V.—AN IMPROVED HEAD-REST.

An experienced photographer, Mr. H. P. Robinson, once gave it as his opinion that no sitter should be posed for the camera without the aid of the head-rest. In this he was quite right. There is no person who sits for his portrait but imagines that in *his* case the head-rest is a most objectionable feature; for others it is all very well, and doubtless highly necessary, but, as for him, *he* can "sit as steady as a rock," and hence does not require such aid to stability. This is an old story, and every portrait photographer has listened to it over and over again.

Let no artist for a moment ever lose sight of the fact that a head-rest is an indispensable adjunct to successful photography. Let its gentle persuasive influence be brought to bear upon the sitter—by fair means if possible, but by flattery, or even by force, should the necessity arise. Firmness and tact on the part of the photographer will soon assert themselves, and the "client" will or ought to be made to arrive at the conclusion that the photographer is, after all, the best judge of the conditions under which he or she can best be taken.

The number of head-rests at present within the reach of photographers is very great, and equally so is the variety displayed in their construction. From the patented article of the kind now to be noticed it appears that prior to the present time invention in this department has not been altogether exhausted, and that points which have escaped the attention of previous inventors have been observed and seized upon by others. A curious point here presents itself—How or in what manner does the thriving manufacturing town of Leeds come to be so intimately associated with head-rests as is the case? Mr. Harrison, of that busy town, introduced, a few years ago, a head-rest which we know is extensively used and much liked; Messrs. Harvey and Reynolds, of the same town, subsequently introduced a head-rest in which the most hypercritical of critics would be puzzled to discover any fault; and in the new head-rest the specification of which is before us, and which likewise hails from Leeds, it is not a little difficult to discover in what direction the inventive faculties as applied to head-rests can farther go.

Mr. Charles Johnson, in the patent to which we here direct attention, gives his idea of a head-rest, and from his specification, as well as from an opportunity afforded by an actual test of the invention as reduced to practice, we proceed to give the following description:—

The invention relates to an improved means of enabling the rest to be adjusted in any desired position or at any desired height. Mr. Johnson says that the upright rod on which the rest is carried has generally been hitherto fitted to slide in a corresponding socket provided with a set screw to enable it to be fixed at any required height, a separate joint being provided to admit of the rest being adjusted at the required inclination. But in his invention the means of adjusting this vertical and lateral adjustment by one and the same operation is provided for by a ball-and-socket arrangement of the following nature:—The ball through which the upright rod passes is made in halves, clamping the upright rod between them so as to grip the rod tightly when the socket in which the ball works is tightened up. This socket is made in two parts hinged together and provided with a thumb-screw, by which it (the socket) may be tightened up or loosened as required. By loosening this thumb-screw the upright rod may be slidden through the ball, and, at the same time, inclined by the ball working in its socket, whereby the rest is adjusted both as regards height and position at one and the same action, the whole being firmly secured by tightening the screw.

From the following observations a suitable idea of the details of Mr. Johnson's patent head-rest will be obtained:—

The body or stand of the head-rest does not differ in any essential feature or form from that of the majority of the rests now in use; but in that part in which the upright rod peculiar to all rests is attached to the stand we find an important difference, the ball-and-socket principle being introduced. The rod, instead of sliding up and down through a hole in the stand, is made to slide through a hole in the centre of a split ball, which ball is capable of rotating in a capacious socket, and, by means of a large winged-headed thumb-screw, it may be pinched and thus fixed in any desirable position. By the universality of the motion thus imparted to the rod which carries the fork for the sitter's head or neck the adjustment is greatly facilitated, seeing this can be effected without disturbing the position of the stand, for the ball allows the rod to be placed in any position, straight or diagonal, required.

The fork can also be moved in a rotary direction vertically. The means by which this motion is obtained are very simple, but not on this account the less excellent. There are two discs with flat faces—one of them attached to and forming the head of the principal rod of the stand, the other being loose and free to rotate round a pinching screw through the centre, which serves as a centre of rotation. In the face of this loose disc there is a hollow or groove capable of containing the rod of the fork, the fitting being adjusted in such a manner as to allow the fork to be quite loose and to be freely rotated round the axis, or to be pushed in and out, perfect rigidity being immediately effected by turning the thumb-screw. A hip or body rest is also supported upon the main rod.

As we have been afforded an oportunity of examining one of the head-rests which form the subject of the patented invention now described, we may add that it certainly does possess all the universality of motion claimed for it, the ball-and-socket arrangement giving great rigidity when the screw is pinched. The iron work has been tinned in order to prevent rusting.

We have referred to the article at page 64 of our present volume and find, as we expected, that we do not make the statement which Mr. M. Carey Lea, in another column, imputes to us, namely, that "the sensitiveness of pure silver bromide cannot be increased by placing any substance in contact with it." The opinion we expressed in that and a previous article was—that *organic* substances act as retarders, and that no *such* substance is capable of increasing the rapidity of bromide of silver. We do not for one moment dispute the fact that silver nitrate increases, and considerably, the sensitiveness; but this salt cannot be ranked under the head of "organic matter." The comparison between silver bromide upon paper and in a film of collodion, which Mr. Lea considers so conclusive, does not appear to us in that light. Does it not strike Mr. Lea as possible that it may be, as we hold, the retarding influence of the constituents of the paper, rather than the accelerating action of the collodion, which produces the result spoken of? As regards the moistening of one half of a *dried* plate with solution of pyrogallol for the purpose of

increasing the sensitiveness, if plain water be used the same effect precisely will be produced. That is no evidence of the accelerating effect of either pyro. or water, but merely the natural difference between a wet and a dry plate. But let such a dry plate, or even one which has been washed and is still moist, have one half coated with solution of tannin, the half so coated will be found, after exposure and development, to possess less detail than the other, though it will have much greater brilliancy. With regard to the latter portion of Mr. Lea's communication we can only say we regret the necessity for, and existence of, these constant "reclamations" which, as Mr. Lea says, "lead to unpleasant discussions" without being productive of any good. It cannot be expected that one man can carry the whole photographic literature of the past twenty years in his head; and we have a better opinion of the writers in our columns than to suppose that they would wilfully appropriate one another's ideas. To show Mr. Lea that he himself, excellent though his historical knowledge be, may have overlooked some portion of photographic history, we may state that the gum-tannin preservative was in common use in this country at least ten years ago; also, that his suggestion at page 76 of the present volume, to use glycocine in the printing bath, was made by Mr. H. Cooper, jun., at page 647 of our volume for 1865.

SENSITISERS AND PRESERVATIVES.

I remarked lately in the columns of this Journal upon the inappropriateness of the term "preservative" as applied to substances intended to improve the character of dry plates; since then two editorial articles have appeared upon my remarks, in which views differing from mine are conveyed. In the latter of these articles (that of February 11th) the opinion is expressed that the sensitiveness of pure silver bromide cannot be increased by placing any substance in contact with it. The opinion seems to me so inconsistent with well-known facts that I almost feel as if there must have been some mistake in its expression, and have referred to the article again to assure myself that I have correctly stated it.

It is well known that silver bromide formed on paper is considerably less sensitive than when formed in collodion; in other words, the constituents of collodion act to increase its sensitiveness, and different collodions and pyroxylines act very differently in this respect. Some give high sensitiveness and little intensity, some are deficient in both characteristics, and some most valuable sorts confer both sensitiveness and intensity. These well-known facts seem to me to be conclusive—all the more so as no proof is offered to support the contrary view. But I need by no means stop at this point. Other well-known facts may be alleged. Silver nitrate increases the sensitiveness of silver bromide in a very marked way, causing some permanent molecular change which subsists even after the silver is washed away.

I might allege other proofs (and shall do so presently in reference to another view, with evidence applying also to this); but even were there proof in support of a contrary opinion the foregoing facts would seem to be decisive.

In the same number Colonel Stuart Wortley, whilst apparently assenting to the editorial view, in reality expresses a complete dissent from it, except in one particular and exceptional point, viz., that every preservative "applied to the exterior of a dry film lessens in some degree its sensitiveness."

This is a very odd sort of argument against the view which I expressed. I said nothing whatever about preservatives "applied to the exterior of a dry film." My remarks were entirely directed to preservatives applied to the interiors of films still moist and absorbed entirely through their textures, as is customary in preparing dry plates made according to the older methods.

But even in this view Colonel Wortley is, I believe, entirely mistaken. A film already dry may have a "preservative" washed over it, and increased thereby in sensitiveness. For example: a washed emulsion film may have half its surface washed over with a solution of pyrogallol, one grain to the ounce of water, and then, if exposed still moist, it will be found that the part which has received this treatment is distinctly more sensitive than the other; that is to say, the part so treated will, with a brief exposure, exhibit more detail than the other portion exposed simultaneously. The difference between the two will be perfectly well marked, and leave the experimentalist in no sort of doubt as to the result; so that either water or pyrogallol, or both, have acted the part of a *sensitiser.*

To this proof of my view I might add a dozen others, some involving the use of substances not heretofore employed in photography; but one decisive and well-marked proof destroys a contrary theory as well as a hundred.

Towards the end of the same letter Colonel Wortley says:—"In your Almanac for 1872 I proposed a mixture of gum arabic and tannin, and this combination has lately been advocated by Mr. M. Carey Lea," &c.

At a period anterior to Colonel Wortley's first connection with negative photography* I had carefully examined the combination of gum and tannin, and gave my views as to it in the Journal for 1870, at page 193, in the following words:—"For a time I scarcely did justice to tannin, and this because I used it in the heavy doses ordinarily recommended; but when it is kept down to two or two and a-half grains to the ounce, with six or eight times its weight of gum, it does very well indeed."

Colonel Wortley, who on many occasions has done me the honour to reproduce my views and my processes, omitting only the customary acknowledgments as to source, reproduced also this idea of combining gum and tannin, and published it, two years after me, in the Almanac for 1872, as appears from his own words quoted above. Reclamations of priority, even based on evidence as clear as day, lead with some persons to unpleasant discussions; therefore I have in frequent cases, rather than be subjected to these annoyances, let such appropriation pass in silence. I did so in the present instance, and should never have cared to advert to the matter; but when Colonel Wortley, after publishing my ideas as his own, actually turns upon me with a charge of having taken them from him, it is a little too much. It is the chloro-bromide matter over again. So with the collo-developer, which Colonel Wortley has of late years adopted and written much of, always without a word of acknowledgment. I am waiting to learn that my ideas of 1866-7 on this subject were derived from Colonel Wortley's publications of 1873-5.

M. Carey Lea.

PROLONGED EXPOSURES BY THE WET-PLATE PROCESS.

[A communication to the Manchester Photographic Society.]

One of the weak points appertaining to the wet-plate process is the great difficulty, particularly during the hot months of July and August, of keeping the plate, and then developing it successfully, for any longer period than twenty or thirty minutes after taking it out of the nitrate bath. This drawback is, for several reasons which will presently appear, a much more serious one in the case of photographing a very dark interior, where an exposure in the camera of not less, and in some cases very much more, than an hour is required.

It will be within the recollection of many now present that about two years ago some excellent prints were shown in this room by Mr. Kershaw, of Buxton, printed from plates which, after being sensitised in the usual way, were carried several miles to make the exposure, and developed, without a stain or mark of any kind, three or four hours afterwards, the only expedient resorted to being the very simple one of keeping the slide buried inside a large wet towel.

I have myself found, in the case of taking a group—when there has been considerable delay, after the plate has been sensitised, in getting the individuals together—that by laying the slide face downwards upon the damp grass with a damp cloth thrown over it the plate will keep good for an incredibly long time, the obvious reason being that in a well-made slide, when placed in this position, the plate is almost hermetically sealed up. It is, however, when the plate is in a vertical position in the slide, with the whole open space of the interior of the camera in front of the film, thereby facilitating evaporation during an exposure of from thirty minutes to three hours, that its keeping qualities are put to the most crucial test.

It is true the rapid symmetrical and rectilinear lenses are in some cases great helps in getting out badly-lighted subjects with a considerable reduction in the exposure; but for general interior work I find that the wide-angle lenses must be used if anything like an adequate idea of proportion and size is to be given, and that, of course, means a small aperture and long exposure.

The difficulties militating against the successful development of a plate which has had a very prolonged exposure may, I think, be reduced to the usual orthodox number of three, viz., uneven development, oyster-shell markings, and the drying of the film. I

* Mr. Lea is apparently unaware of the fact that Colonel Wortley is a veteran photographer, and that his name has been connected with negative photography from a period antecedent to the tannin process itself.—Eds.

need, however, say very little under the first head, because it is rather a question of skill in manipulation to run the developer at one sweep over a film to which it does by no means take kindly after a very long exposure in the camera. The other two divisions I shall treat in a general way rather than *seriatim*, because one is intimately associated with the other.

Various expedients have from time to time been resorted to and suggested to prevent the drying of the film during a long exposure, and to make the development more easy and successful afterwards. My own experience, however, tends to the conclusion that it is much more desirable to guard against complexity in manipulation, and endeavour to keep the film moist by other means than either glycerine or the redipping of the plate in the nitrate bath before development. I much regret that for want of time I have not been able to make many experiments, which I purposed doing before preparing this paper; but I have, at any rate, fully satisfied myself by repeated comparative trials that the redipping of the plate in the nitrate bath before development very much injures the softness of the resulting negative, and makes what would be a fully-exposed plate without the redipping, equal only in quality to one which has simply had half sufficient exposure.

I have also tried the application of a mixture of bath solution and glycerine in various proportions, both before and after exposure, and although I have obtained what I have considered at the time, in the absence of any other negative of the same subject to guide me, a good result, yet when I have afterwards, and for the sake of comparison, taken another negative without the glycerine the result has been so infinitely superior as regards brilliancy and gradation of detail that I have long since come to the conclusion that our hopes in this direction must be neither in glycerine or the redipping of the plate after exposure, nor, in fact, in any chemical application to or treatment of the film after sensitising and before development.

With respect to the drying of the film and oyster-shell markings: they are two distinct defects and totally different in appearance, and yet the one may be said to be caused by the other, although they do not always both make their appearance on the same plate. I sometimes get drying marks alone, as in the negative before you, in which you will see the haloid salts have crystallised in groups on one part of the plate consequent on the drying of that particular part. This plate was sensitised and developed in an intensely-hot tent on which the sun had been shining, and it was exposed in the camera on a very hot day for forty-five minutes; yet it is not a failure, for the defects coming in a shadow are not shown in the print.

Before proceeding further it will, perhaps, be well to state here that a suitable collodion is of the first importance when a prolonged exposure is necessary. Naturally a porous or powdery collodion suggests itself as being the most likely to retain the moist condition in which it leaves the nitrate bath intact for the longest period; but it unfortunately happens that a collodion of this nature, although the very best for dry plates, is most unsuitable for wet ones, by reason of its greater slowness and the weak and flat images which it gives. I have succeeded best by mixing with a good normal collodion for wet-plate work about one-third its bulk of powdery collodion. This, I find, gives me greater immunity from troubles with long exposures, and does not interfere sensibly with the good qualities of the original collodion.

When the plate has been in the bath long enough it should be drawn up on the dipper very slowly. After draining over the bath for a few minutes it should be fixed with the bottom edge on a pad of blotting-paper, and in this position allowed to drain for about five minutes before it is transferred to the dark slide. I also put a damp pad of cloth inside the camera and a similar one on the back of the plate in the dark slide, and after drawing out the shutter I put a large wet towel over the back part of the camera.

With respect to the development: I do not advise a stronger solution of iron than twenty-five grains to the ounce, unless there are violent contrasts of light and shade, in which case it may be advantageous to increase the strength up to forty or fifty grains. Gelatine should on no account be used in the developer, as it sometimes causes the film, when under-exposed, to split up on drying.

For interior work, or, in fact, any other kind of work where long exposures are necessary, I think both the camera and dark slide ought to be specially constructed with a view to meet the difficulties of the case. I have used almost every variety and form of camera and camera slide, and have found that, whilst some have given perfect freedom from defects of every kind under the most trying circumstances and with the fewest precautionary measures, with others it has been absolutely impossible to get anything like successful results under similar circumstances.

It has been rightly said that in order to understand the nature of a chemical difficulty it is a good thing to learn to produce that difficulty. Take one of the old French cameras, such as were in vogue in the early days of photography, and then chiefly used in the glass positive process, the dark slide unvarnished both inside and outside, the lower edge of the sensitive plate resting its whole length on the rebate, and no well to receive the drainings from the plate. Expose the plate in such a camera for any length of time exceeding fifteen or twenty minutes, and I can answer for it that, however much image may be developed, there will be a famous crop of oyster-shell markings brought out simultaneously.

The cause of the drying marks—or, rather, spots, which they really are—is, as I have already intimated, the partial evaporation of the water from the film causing the haloid salts to collect together in groups and crystallise. But the oyster-shell marks, although resulting in part from the same cause, also result from another cause, viz., imperfect draining off the film of the superfluous nitrate solution, and they are invariably produced before the further stage of dryness is reached when the silver salts begin to crystallise; that is to say, as the upper part of the film is gradually becoming dry the solution is meanwhile draining towards the bottom edge, and although that edge may be resting on a pad of blotting-paper it is not always thereby effectually removed from the plate. Even when it is effectually removed, if the pad become quite saturated as the plate gradually becomes dryer it begins to creep up by capillary attraction in irregular lines for a certain distance on the lower part of the film. This, at any rate, is my theory of the cause of these vile markings, the real drying spots being invariably at the top of the plate where drying will naturally commence, and the oyster-shell marks as certainly appear towards the bottom.

If this be the right view of the case it follows that a great improvement may be made in the apparatus to be used; and for this special kind of work I see no reason why the body of the camera should not be made of japanned tin. The dark slide should also, in my opinion, be made much larger every way than is usual, so as to allow a carrier, which will facilitate the draining of the plate, and having a large recess underneath for blotting-paper. It should also have more room between the back and the shutter, so that a thick, damp pad can be put behind the plate to prevent drying, and, at the same time, an arrangement should be made to prevent the damp pad touching the blotting-paper at the bottom of the plate. There should also be a clear space of at least a quarter-of-an-inch between the film and the shutter, so that there will be no danger of the former being pressed against the latter should the plate be slightly convex on that side.

I find that slides made of close-grained and well-seasoned Spanish mahogany, with the inside of the shutter French polished—not blacked—and the rebate coated with shellac, have given me the least trouble to keep the plate moist. Of course the inference from this is plain—the less porous both camera and slide the more effectually will evaporation be prevented during exposure.

I have here a carrier which I have had specially made to carry away the drainings from the film. You will see that the plate is supported on two very small bearings, and underneath is a space for blotting-paper. With this carrier I have had neither drying spots nor oyster-shell markings with an exposure of two hours and a-half. The old form of carrier does not carry out this idea sufficiently. There is certainly an approach to it; but there is sufficient bearing at each lower corner of the plate to collect a pool of silver solution as it drains from the plate, and it is not easy to carry it away by blotting-paper.

The examples I have brought with me to-night are in many cases difficult subjects, and have had exposures varying from thirty to 160 minutes. They have not, however, been taken by a metallic camera or any special form of dark slide; but I have met with so many difficulties in rather a large experience in this special kind of work that I believe some such modifications in the construction of apparatus as I have indicated are not only greatly needed but would be largely patronised. J. POLLITT.

THE PRINTING DEPARTMENT.

BEFORE toning the prints they should be well washed in three relays of water, until the free nitrate of silver is extracted. This water, which will assume a milky appearance, should be preserved in a jar, and a little common salt added occasionally to precipitate the silver. It will be perceived when it has all settled to the bottom by the clearness of the water. It can then be poured off, care being exercised not to disturb the sediment, and fresh washings added. At the end of the year a white substance resembling chalk will be found accumulated at the bottom. This should be taken out and put in a dish over the fire to dry, when it will be ready for the refiner. The silver cuttings should also be kept in a box or bag, and burnt every six months, as otherwise they would occupy a large amount of space.

When fixing the prints it is better to use a weak solution of hypo., giving them from fifteen to twenty minutes in the bath, for by so doing they will stand better.

The best mounting material is undoubtedly Glenfield patent starch. It has no decomposing ingredients, is clean, and easily used. It should be made fresh every day, pretty thick, and allowed to cool before use.

The prints should be laid in a little pile one above the other, face down, slightly damped, and gone over lightly with the starch brush, taking care not to leave any lumps; then raise the corner gently with a pin and put on the mount, rub down between a sheet of note paper, and put under a weight to keep them from springing.

If the card be an enamelled one you will require to place a plain mount between each mounted card, or else they will stick and spoil. They should be kept under the weight all night and touched the next day. Before pressing they will require to be dried over a stove or before the fire. A good pressing-machine heated with gas is all that a photographer requires to give a finish to his work. The idea of lacquering and burnishing up a *carte* until it shines like a "kittling's eye in a tripe-shop window" (to use a comic phrase) is quite absurd. I have seen photographs polished so bright that they might be used as mirrors. A highly-glazed surface is not requisite, for if an operator cannot obtain good tones and fine finish without soap and all such artifices the sooner he leaves the profession the better. After the *cartes* are pressed they should be put in their numbered envelopes, ready to give out. They should be laid on a clean table the same as they would be on the stretcher. Take the negative, find the *cartes* belonging to it, and put in an envelope, marking the number on the outside, and place these envelopes in a drawer in rotation, so that when called for they can be found without loss of time.

What I have said on the subject of printing, &c., may be thought by some old and stale. To the old photographer it may be; but we must not forget that there is a rising generation to look to, and if any of my remarks have helped a young traveller on in the right direction I am satisfied. LINDSAY HOWIE.

NOTES ON COLLODION EMULSIONS.

[A communication to the Photographic Society of Great Britain.]

HAVING been requested by the President to open the discussion on Mr. L. Warnerke's able paper, I offer the following remarks:—

On the question of my proposal to make an organified pyroxyline I am glad to find that Mr. Warnerke's experiments lead him to think it will be of value to my co-workers. I learn that it is greatly valued by those who have tried it, and, with the exception of one or two failures through the use of nitrate of potash instead of nitric acid, no difficulty has been found in its manufacture.

It is well to notice that the organic portion of the pyroxyline is largely soluble in water; and I have found that by boiling a sample of organic pyroxyline the organic portion is rapidly parted with. The pyroxyline is very soluble in alcohol and ether, and twenty grains to the ounce dissolves with hardly any deposit.

With regard to the formation of an emulsion two points require special notice—one, the effect on the emulsion of the use of various haloid salts; and the other, the effect of temperature on the emulsion.

I have tried the following bromides in emulsion, and find that a nearly identical result is obtained as regards the sensitiveness, provided a sufficient length of time be allowed to elapse before using the emulsion, though density appears to be acquired at once, and not to be affected by leaving the emulsion longer to mature before use. To obtain a certain degree of sensitiveness the following time was required by the several bromides, as under:—

Manganese	7	hours,
Cadmium	9	„
Strontium	10	„
Magnesium	10	„
Zinc	$10\frac{1}{2}$	„
Cerium	14	„
Potassium	14	„
Cinchonine	15	„
Sodium	$15\frac{1}{4}$	„
Calcium	17	„
Ammonium	$17\frac{1}{2}$	„
Uranium	$17\frac{1}{2}$	„
Barium	19	„

while bromine had but arrived at the same degree of sensitiveness in 24 hours.

Temperature, moreover, exercised an important influence over the result, as in nearly every case I obtained the same result by keeping the emulsion at a constant heat of 70° in about half the time I should have required at a temperature of 40°.

So far with regard to making the emulsion; now with regard to washing it. The organic salts formed appear to be in great part washed away in the washing water, and if the water be used warm a weak and thin film is sure to be the product. Hence the great advantage gained by adding gelatine dissolved either in sulphuric or nitric acids to the washed emulsion, as a rich, dense negative is thus produced without any difficulty, and with no loss of sensitiveness. I prefer this method of working to that of organifying the pellicle, as giving a far more certain and better result.

You will notice I include bromide of cinchonine among those experimented with. This having an organic base is particularly suitable for use, and gives most excellent negatives. I have cut my remarks short, as I am sure there are others who will have plenty to say. H. STUART WORTLEY.

OBSERVATIONS ON GRANULARITY IN CARBON PRINTS.

THE joyful pæan and the mournful dirge have each been employed in chanting the advantage or mourning the loss occasioned by a certain effect sometimes obtained in the practice of carbon printing, such effect giving a granulated or reticulated appearance to the print.

How this can add to the beauty of a *carte* picture one is at a loss to imagine. Although I am not of that school who believe in microscopic sharpness in portraiture, yet the value of a few sharp touches is known to all. However, in art matters opinions widely diverse may be held, and hence criticism thereon partakes more or less of that of which Englishmen are so justly proud, namely, "the glorious uncertainty of the law."

Those who are in search of that "fuzziness" so delightful to the eyes of some can indulge their desires to an almost unlimited extent, and upon the first evidence of the truth of this circumstance can, in the exuberance of their joy, like the philosopher of old, give gratuitous and public lessons in the study of the nude, and with him cry "*Eureka!*"

But to cease banter. If the few observations intended to be made aid anyone in overcoming an effect objectionable in his eyes my goal will be reached, and to do this I do not think it necessary to give formulæ. It is sufficient to say that such considerations as will be laid before your readers enabled me to obtain prints at pleasure in which reticulation was quite absent even under microscopic power.

In the first place, it will be well to examine how such reticulation can be brought about in its worst form. When a picture is developed on the temporary support, it retains after the operation a considerable amount of water, and if while in this condition the transfer paper be applied, upon the separation of the picture from its support the appearance of reticulation will be obvious; hence the practice to dry the picture before applying the paper for the final transfer.

Hitherto this loss of sharpness has obtained various names, and had similar variety in the remedies suggested for it. So far as regards nomenclature I would recommend "reticulation" as being the name giving the clearest idea of the defect; and, in reference to remedial measures, any and every one that is not based upon the broad principle of preventing unequal expansion of the gelatine forming the picture and its support may safely be discarded.

That the difficulties lying in the way of obtaining these conditions can be, and sometimes are, increased in the manufacture of the tissue is well-known to those initiated in the mysteries of tissue-making. Still the knowledge gained by a close study of what produces the defect naturally suggests the remedy, viz., the prevention of any expansion of the picture (after once drying) in the operations of the transfer to the final support. Bearing in mind in carbon printing that we are working with material that expands in water considerably will aid the careful and thoughtful worker to overcome such an evil as that I have ventured to make these observations upon. That formulæ are in some quarters more acceptable than the laws from which they are deduced I am aware; but the genii of formulæ preside not over me now, and this short article has been penned more in the spirit breathed in those grand words of Tennyson:—

"At least not rotting like a weed,
But having sown some generous seed,
Fruitful of further thought and deed.

And men thro' novel spheres of thought,
Still moving after truth long sought,
Will learn new things when I am not."

W. E. BATHO.

VARIOUS MATTERS CONNECTED WITH THE SUCCESSFUL PRODUCTION OF NEGATIVES.

[A communication to the South London Photographic Society.]

A VERY important part in the production of a good negative is a clean plate. "Pooh!" says some one; "easy enough. If you have new plates put them into a little acid and water, or, if varnished ones, put them into a hot solution of washing-soda." Now this is wrong.

With new plates the principal difficulty to be contended with is grease. Put a greasy plate into acid and the grease is rendered insoluble and very difficult to remove; but if it be put into a solution of potash the grease becomes soluble, and is quickly removed by rubbing with a piece of flannel under the tap. The plate may now be put into acid, after which it is well rinsed and put into a rack to dry. Varnished negatives may be treated in the same way, as a few hours' immersion in a solution of potash is sufficient to loosen the most tenacious film.

Failures in operating should not be allowed to dry, but the film should either be washed off there and then (and, by the way, a small squeegee is an excellent thing for this purpose), or else the plates should be immersed in water till an opportunity offers; then, after cleaning off the film, proceed as above.

There is one thing worthy of very special attention, namely, never to leave plates standing in a heap with liquid between them, more especially either alkali or acid, as the solution in evaporating attacks the surface of the glass and stains it, after which no amount of cleaning short of repolishing will make it fit for the reception of a negative. Always let the plates dry in a rack—not in contact with each other; then the liquid drains away, leaving the plates dry. If proper care were bestowed upon the plates it would be astonishing how few bad baths there would be in the course of the year.

The next subject is the negative bath. If all the matter that has been written about the negative bath were collected I fancy it would make a rather large volume; and still we are not content. In the two almanacs for the present year there are fourteen different methods of managing the bath; but of all these that described by Mr. H. J. Burton is the best and simplest. As I work daily with baths prepared in the same manner I cannot do better than give you a *résumé* of it.

First of all, work the bath until the negatives show signs of pinholes; then remove it from the holder and filter half of it in the dark. Return to the holder (which, of course, has been well washed in the interim), and add to it an equal bulk of a plain forty-grain solution of nitrate of silver dissolved in sunned and filtered rain water to which a little silver has been added. The bath is now ready for use, and will be found to give negatives far better than would be obtained from any new bath.

The remaining half of the old solution may be boiled down and crystallised. The crystals are washed and dried, and then can be used as ordinary crystals; for when obtained in this way they are quite free from iodide, acid, or organic matter.

Do not let it be supposed that I condemn sunning the bath, for this is not the case; but if a bath, either all or in part, which has been in use is taken into the light, an action is at once started, and unless that action be allowed to go on until completed it is hopeless to attempt taking good negatives. Therefore, if a bath is intended to be used again directly keep the light from it; but if time can be spared give it all the light possible.

About filtering a bath: let any photographer who uses paper for the purpose of cleansing the solution properly just try for once the stuffing of the funnel with cotton-wool (which should have a little alcohol and ether run through, and then washed with water), and see the difference between the bath filtered so and through paper.

In conclusion: I would like to say a few words upon bath-holders. All of you know how soon a dark slide wears out on account of the solution from the plate rotting it, because it is almost impossible to drain the plate properly when using the dipping bath. Mr. Abel Lewis, in the two almanacs, gives a description of a draining-box for sensitive plates. I can recommend a better piece of apparatus than that—which, in addition to being a good draining-box, has the further advantage of saving silver, and also of being about the only piece of photographic apparatus that in its working is perfection—and that is a horizontal swing bath. Once used it will be always used; but, like a good many more things in photography, its greatest disclaimers are those who never worked with it and very likely never saw it. W. T. WILKINSON.

ON THINGS IN GENERAL.

AT the present time the phase of permanent photography which, by reason of report alone, has an interest second only to carbon printing, is M. Leon Vidal's celebrated photochromy. Lord Bacon ends his fragmentary essay on *Fame* (for which word we should nowadays read "report") with a most wise apothegm, which seems to have been well studied by the "exploiters" of all new photographic processes:—"*Let all wise governors have as great a watch and care over fames as they have of the actions and designs themselves.*" Surely he had photographers in his mind when he penned such a piece of advice so remarkably *apropos*. But have we not had enough of reports only of this wonderful process? In the number of THE BRITISH JOURNAL OF PHOTOGRAPHY for February 11th, Professor Stebbing states that M. Vidal had promised to let the Editors have an example of his process, that English photographers might have a chance of judging of its capabilities. Will the Editors please to tell me and other eager ones whether they have received this picture yet?*

I extract the following paragraph from *Nature*, for March 9:—"Mr. Cunliffe Owen, the director of the South Kensington Museum, visited, on Saturday last, the photographic workroom established in the *Moniteur* office, Quai Voltard, Paris. The peculiarity of the process used is the reproduction of colours by a series of chromo printings. It is a combination of photography and chromo-lithography, which gives astonishing results, chiefly in the reproduction of models of engines and *natures mortes*." This would suggest a very different process from that we have so often had described to us—a series of portable superposed gelatine films, each of different colour—and a "photographic workroom" does not convey, to our mind, the vast establishment hitherto paraded. Truly, permanent photography of every kind—polychromic, collotypic, and autotypic—has much to struggle through ere it attains full growth.

Last month I had to describe how the *Athenæum* flouted at the truth of its claims; so again, on Saturday last, it falls foul of the photo-zincographic process. Because a photographic printing-press has produced a heavy counterpart of a light and elegant original, "it must, in fact, have been obtained by that process." Their reviewer must have given some attention to photographic press printing to speak thus positively. His knowledge of typography seems more limited, for he states that in this "photographic" reproduction words want spaces which are properly spaced in the original. As this is an impossible feat in photography it certainly requires explanation from the publisher of the work reviewed.

Still *apropos* of carbon printing. I see a long and technical article has been read before the Glasgow Photographic Society, by Mr. John Urie, on *Carbon Printing Paper*. He gives very explicit instructions, based on experience, and a great deal of historical information; but it is not a little remarkable that he did not exhibit either a sample of the paper he so carefully described or a print made from it, but, instead, he brings a sample of printing-ink. Possibly he had in view the terrors of the patent law. It would have been his best policy to have made his tissue openly and pushed it far and wide; some great company might then have offered him a partnership.

I see there is a probability of the great French carbon process trial coming to nothing. Another compromise? If a really good fight could come off between the Autotype Company and some infringer much light would come of it. But, unfortunately for the infringer, he would be fighting other people's battles. If he gained the day, I don't suppose any of those who would be equal gainers with himself would be inclined to share his expenses.

At the meeting of another photographic society—The South London—an interesting paper was also read. The writer did not claim any special knowledge, and, as he said, merely wrote a suggestive article. Mr. J. T. Taylor hit well on the head a suggestion made by one of the speakers, with regard to using two lenses—one in place of the ground glass to magnify the image, and so get large pictures at once. It does seem remarkable that this idea is so common. One would think very little consideration was required to show that as the lens was not as large as the ground glass it could only take up as much picture as its own size on the ground glass. The Editors, some time ago, gave an excellent and practical account of the best way two lenses could be made use of in the manner indicated, namely, for astronomical photographers' purposes. I see another case introduced into the paper itself that shows the still more common error regarding a stopped-down lens being equivalent to a lens with the same amount cut off its edges. Some day, if they are not tired of repeating the old tale, perhaps the Editors would revert to this subject, and show again how utterly different the two cases are, and must be.

* We have not.—EDS.

One of the most interesting communications printed for some time is Mr. Warnerke's paper on emulsion investigations. It is such original investigations as these that further the advance of photography; pity there are not more of them! I suppose "it don't pay;" that is the universal touchstone applied to all processes at present. The iodides and bromides are having a field-day of late in every direction. A variety of additions to our knowledge have been made, not the least among which is the fact (?) that no visible effect is produced by light upon iodide of silver alone upon a sensitised plate.

Several contributors to this Journal have recently been taking especial pains to point out the difference between iodides, bromides, chlorides, &c.; but in America such matters are evidently little appreciated by some operators. A gentleman, at the meeting of the Photographic Section of the American Institute, attributed a deposit in his bromide emulsion to the acidity of his collodion causing a precipitate of iodide of silver through the liberation of free iodine. On being asked where the iodine came from he replied with *nonchalance* that it might have been bromide. This is rich; it is too good to be lost in Anthony's *Bulletin*, and I transfer the account to these pages.

FREE LANCE.

FOREIGN NOTES AND NEWS.

TONING BATH.—RENTS IN THE COLLODION FILM OF NEGATIVES.—PHOTOGRAPHIC HYGIENE—TYPOGRAPHIC PRINTING IN FATTY INKS.

HERR NORDEN says that a very satisfactory toning bath can be got as follows:—Dissolve some gold in *aqua regia*, evaporate the acid solution, and heat again the dry residue until it is partially dissolved. When it has become cold dissolve it in muriatic acid, then again filter off the metallic gold which remains undissolved, and again evaporate the solution carefully. The auric salt left behind is now dissolved in water to which a little lime water is added. This gold bath tones *three* times as many pictures as other baths with an equal quantity of gold.

Herr Gustav Wehl, of Munich, writes an article in the *Correspondenz*, on the cause and prevention of the peeling off and tearing of the varnish of negatives, in which he says:—

"It is not yet possible always to guard against the peeling off or tearing of negatives; indeed, rents often appear without any apparent cause in the most unexpected places in negatives which have been treated with every precaution. The subject has been well ventilated on all sides, and all sorts of varnishes have been employed, without removing the fault. Lastly: it has been ascribed, though erroneously, to the brittleness of the lac. This is a subject of which I have long been endeavouring to get to the bottom, and I have come to the conclusion that any of the various kinds of lac, when borne upon a collodion film, rinsed with water, and then dried, will show rents if its temperature be often and suddenly changed, and that in a short time. A collodion film, on the contrary, which has not been washed with water, and from which, therefore, the water does not require to be dried, if coated with the same varnish, does not show this flaw. Further: one and the same collodion splits less readily when exposed to the same temperature, if it be shaken up with a like quantity of water and then dried, than the same collodion unmixed with water and dried.

"Putting these two facts together it may be assumed with certainty that the cause of the destruction of the negatives is not to be found in the kind of varnish, but in the treatment which the collodion film undergoes in being rinsed with water, and, above all, in the subsequent drying. Such a film has received the property—since it no longer adheres firmly to the glass like an unwashed collodion film—of absorbing moisture and giving it up again; and, if the opportunity of doing this be afforded often enough, the film curls in slight swellings at certain places, which eventually form serpentine curves or some similar figure. If these are not touched from time to time with a pencil dipped in alcohol they rise up like blisters, break, and cause rents; yet the touching with alcohol only gives a temporary relief, for more blisters will rise up again on such plates.

"How does it happen, then, that varnishes are so differently estimated? Simply because the time and place of printing from the plates, though they have a great influence on the result, are taken too little into account. Latterly a substratum, such as albumen, lying between the glass and the collodion film, has come into use, and negatives stored in unheated rooms are printed in unheated printing places and not exposed to the direct sunlight. We may, therefore, conclude that, though one varnish may be more likely than another to show the fault in question, the whole fault cannot be attributed to it, as whenever the collodion film is freed from water by evaporation it no longer makes its appearance, and then one may expect the negative to be durable. I may here remark that when the film is rinsed with distilled water it is less brittle than is the case with common water.

"The water is also the cause of the tearing of the film, but with our negative process, as it now stands, it would be almost impossible to dispense with it, as without it it would be difficult to get workable solutions for developing, fixing, &c., and still more difficult to get rid of them when they had done their work; we are, therefore, obliged to continue to use water. Rinsing with alcohol would be the most suitable way of replacing the water and obtaining a more adhesive film, if its use were not accompanied, in most cases, by the risk of floating off the loose particles of silver which intensification has lodged on the top, and, indeed, of redissolving those which lie deeper; but, even apart from that consideration, the desired result would scarcely be obtained by the use of alcohol, as the water has also something to do with the cohesive arrangement of the particles of the collodion film. Already, before dipping the plate into the silver bath, the precaution is taken of not allowing it to become quite dry after the collodionising, so that the nitrate of silver may more easily combine with the iodide, the water quickly and energetically driving off the ether and alcohol remaining in the pores, and, at the same time, causing a great swelling of the film, which increases with every successive treatment with water until, sometimes, in the course of the last washing, the film being too much extended is partially torn from the plate.

"It is therefore necessary to devise some means which shall, on the one hand, restrain the energetic action of the alcohol, and, on the other, shall replace by some permanent substance the water, which has at present to be dislodged by alcohol after the last washing, or, in other words, which shall support the swollen collodion film by maintaining its consistency as produced by the water, so that its particles shall not sink down when they dry, but become more scaly and acquire the faculty of absorbing moisture and throwing it off again. I attain this result by pouring a varnish upon the wet plate immediately after the last washing with water; in this way the film retains all its viscousness, and is thus protected against rents and pieces of film starting up, as it can now withstand every change of temperature. Plates so treated are also recognisable from their appearance, as the film adheres to the glass better than is the case with ordinary plates, and they are more easily retouched with pencil or needle, as the varnish is not so brittle.

"As will be seen from the foregoing, the proposed use of the varnish involves no material change in the usual mode of manipulation, which is, shortly, to pour varnish number one over the plate and let it drip, then to varnish as usual with varnish number two."

Dr. Henri Napias, whose series of articles upon photographic hygiene we published some time ago, announces in the *Moniteur* his intention of republishing a revised and extended edition in book form. The promised work, being the first ever published on the subject, cannot fail to prove of use to many photographers, who as a body pay sadly too little attention to hygienic matters.

The last number of the *Moniteur* contains a specimen of printing in fatty ink issued from the *atelier* recently opened in connection with the management of that publication for the purpose of working the photochromic and other printing processes allied to photography. The subject is a reproduction of a design upon wood, by H. Giacomelli, and is entitled *Le Printemps*. It is printed in black upon a tinted ground, the effect of which is excellent and the execution, more especially when it is considered that the impression is "pulled" at an ordinary printing-press along with type, is really marvellous.

NOTES FOR A SHORT TOUR IN BELGIUM WITH THE CAMERA.*

BRUGES is one of the most ancient and picturesque towns in Belgium, rich in historical traditions and also in quaint architecture. Having still some hours of daylight the first thing to be done is to see as much of the town as possible, noting our subjects as we go along, and observing the aspects of each so as to know what hour will be most suitable for exposure. The magnificent town-hall is among the first objects that arrest our attention, and, next, the interior of the Church of Notre Dame, with its beautiful carved oak pulpit—amongst the finest in Belgium—the tombs of Charles the Bold, Duke of Burgundy, and his daughter, the many fine paintings by Vandyke, and a marble statue of the Virgin and Child, said to be the work of Michael Angelo. Having found the verger we must make arrangements for being permitted to work next day. This accomplished, we shall proceed on our walk round the town, admiring the varied views on the canal, and then return to the hotel, where, having unpacked what is necessary, and seen that the apparatus is all in working order, we settle upon our future proceedings, and, having supped, retire for the night.

After a good night's rest, and the fatigues of our journey overcome, we shall take advantage of the morning light to secure some of the quaint old houses previously noted; and, after breakfast, take the other subjects that are suitable until twelve o'clock, at which time service is over in the churches and admission can be obtained to work. Now we must use all expedition, seeing that we must leave off again at four o'clock. With the most expeditious dry plates that I have tried and a favourable light I have not been able to get an interior with less than one and a-quarter hour's exposure, working with a very large stop, so that the utmost a dry-plate worker may expect to do will be to secure three negatives. I may mention here a trifling "dodge" which I have found of benefit, and that is to have three *plaques* of rough wood, about three inches square and half an-inch thick, on which to set the legs of the tripod stand. The rough surface of the wood prevents its sliding on the marble floor, and keeps the legs steady, which would otherwise slide. While the exposure is going on we have ample time to examine the monuments, statuary, and pictures, and enjoy the changes of effect that are taking place with the change of light, parts of the walls at one time being tinged with the brightest vermilion, and at others with changing colours of mauve and purple, as the rays of the sun pass through the rich colouring of the windows.

* Continued from page 106.

By the second day we shall have done some good work, and having paid a visit to the Hospital of St. John, and seen the beautiful pictures by Hans Memling, and taken a look at some of the other objects of interest, we shall leave for Ghent by the afternoon train, and as the distance is only twenty-eight miles the journey is accomplished in an hour.

The station at Ghent being on the outside of the town we hail a cab and drive to the Hotel de la Poste, Place d'Armes, where we know we shall have excellent accommodation at a moderate cost, and in M. Van de Putte a most obliging landlord. It being now five o'clock we join the *table d'hote* for dinner, and come to the conclusion that, with the aid of a glass or two of good old Bordeaux, we shall be able to make ourselves comfortable, even with a Belgian *menu*, and that, in fact, foreigners seem to appreciate good living as much as we do at home.

Dinner being finished we now proceed to have a view of the town. Finding nothing of interest in the Place d'Armes we pass through a short street and arrive at the Palais de Justice—a rather large and pretentious modern building in the Italian style. Crossing the river Luys to the Quay au Ble we obtain a fine view of the old Spanish houses on the opposite quay lighted up by the evening sun, which, with the gay-coloured vessels on the water, make such an agreeable combination that puts us on the *qui vive* to get to work. Having looked at this from different points of view, we go on through the Rue des Selliers to the Place de Pharolde and Marche des Poissons. The general view here is from the south-east corner, across the Place, where the circular towers of an ancient gateway coming into play along with the quaint houses on the north and west sides of the Place make an excellent picture, whilst several successive pictures may be taken of the houses separately. Recrossing the Luys again, and passing through the vegetable market and along the Longue Rue de la Monnai, we enter a noble square called Le Marche de Vendredi, where almost every house is a study in itself. In the centre of the square is a colossal statue of Van Artevelde—a great captain-general of the Flemish.

Leaving the square by a narrow cross street we pass on to the Marche de Beurre, on the north side of which stands the magnificent, but unfortunately never-completed, Hotel de Ville, and on the west the picturesque tower of the Belfroi. One glance at the Hotel de Ville shows that it has been erected at two distinct periods—one part being plain in the extreme, and the other equally florid. The more florid part presents an excellent specimen of the Burgundian gothic, the whole wall surface being covered with moulded panelling and niches, but in this respect very unlike our Houses of Parliament at Westminster, where this becomes tiresome and monotonous. In the former it is so broken up and varied in its outlines that the eye is never tired, and even in its incomplete state it is the finest building of the kind in Belgium. Three minutes take us on to the Cathedral of St. Bason's, which is hemmed in with buildings on all sides, so that little of the exterior can be seen at one time. On entering everyone is struck with its noble dimensions; but the great variety of materials and the strong contrasts that exist in the colours—first of the dark oak pulpit with its white marble statues, then the white marble in the screen and its black marble cornices and panels, which are also carried round the sides of the transepts, then the different coloured marbles and gilding of the high altar, and the richly-stained glass windows in the clerestory—all combine to form a noble subject for the painter, but which proves very refractory in the camera.

Among the many fine pictures to be found in the side chapels of the choir, one, by the Brothers Van Eyck, of the *Adoration of the Lamb*, is particularly worthy of notice, every colour being as fresh as when first painted, showing that, with all our improvements, whatever we may do in design, our *technique* has retrograded in place of advancing.

John Lessels.

(To be concluded in our next.)

Meetings of Societies.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.

The usual meeting of this Society was held on Tuesday evening, the 14th instant,—Mr. J. Glaisher, F.R.S., President, in the chair.

After the reading of the minutes of the previous meeting,

The Chairman announced that the next meeting of the Society would be on the *first* Tuesday of April, instead of the second Tuesday as hitherto, but that such a deviation from the usual night of meeting was exceptional and would only occur once each year. He requested members to note the change.

The adjourned discussion on Mr. L. Warnerke's paper, read at the previous meeting, was opened by Colonel Stuart Wortley, who read a paper on the subject. [See page 126.]

Mr. Henry then read a few remarks on experiments with emulsions, prepared according to a formula he had received from Mr. Warnerke.

Mr. J. Spiller suggested the propriety of the omission of *aqua regia* as a restrainer in the bromide-of-silver emulsion, because its action caused unnecessarily complex reactions within the material employed. He therefore suggested preferably the use of bromine or iodine as a restrainer.

Mr. Warnerke was aware of the complexity that arose from the use of *aqua regia* as a restrainer, but he had commenced his researches with accepted formulæ in which *aqua regia* was the acknowledged restrainer. He then alluded to the more systematic method he had laid out for his guidance in the prosecution of his present and future researches, whereby thosecasual elements of confusion would be entirely eliminated. He (Mr. Warnerke) then read a communication in continuation of the experiments described in his former paper. [This will appear in our next number.]

Mr. Spiller thought that, as bromide of ethyle was incapable of acting upon nitrate of silver, it was probable that the action referred to by Mr. Warnerke was due to the presence of hydrobromic acid. He offered to place some pure iodide and bromide of ethyle at the disposal of Mr. Warnerke.

Votes of thanks were conveyed to Colonel Wortley and Mr. Warnerke.

Captain W. de W. Abney then read a paper *On Photographing the Red Rays of the Spectrum.*

Mr. T. Sebastian Davis, referring to certain resins and hydrocarbons that Captain Abney had added to his collodion, spoke of the advantage he had secured by the addition of two grains of guaiacum to the collodion; greater intensity had been obtained.

Mr. J. H. Dallmeyer, after complimenting Captain Abney on the value and interest of his present researches, recalled the attention of members to the circumstance of Dr. Monckhoven's paper, where he (Dr. Monckhoven) had followed in the steps of Dr. Vogel, and had failed to secure the advantages of the use of coloured films. He (Mr. Dallmeyer) thought that Captain Abney's present paper explained the want of agreement of these two eminent physicists in their researches, because he had shown that it was not the colouring action of the additions to the collodion that permitted the photographing of the non-actinic portions of the spectrum, but it was the chemical nature of the additions that so altered the collodion as allowed those effects to be produced. It would seem to follow, then, that by the mere use of coloured films different experimentalists might arrive at opposite results; but Captain Abney had shown that it was the chemical nature of the hydrocarbon used that permitted the non-actinic portion of the spectum to be photographed.

Mr. Jabez Hughes asked what light Captain Abney used during development, as a primary difficulty in taking photographs in the natural colours must occur in using any light at all. Did he develope in darkness?

Captain Abney said he operated in a room that was nearly dark, and the red rays being very insensitive permitted him to effect the development before any injury was done to the image.

Thanks were then voted to Captain Abney for his paper.

Mr. J. Werge exhibited a circular repeating dark slide for dry plates. Some details concerning this will appear in our next issue.

The Chairman, observing that at the next meeting the walls would not be decorated, as they then were, by the splendid productions of the Water-Colour Society, suggested that members should, to prevent the walls being blank, bring or send specimens of their photographic productions.

The proceedings then terminated.

SOUTH LONDON PHOTOGRAPHIC SOCIETY.

An ordinary meeting of this Society was held on Thursday, the 9th instant,—the Rev. F. F. Statham, M.A., President, in the chair.

Mr. W. T. Wilkinson read a paper entitled *Various Matters Connected with the Successful Production of Negatives.* [See page 127.]

The Chairman, referring to the importance of acquiring knowledge respecting the treatment of the negative bath, said it would be well if each photographer had a note-book in which to jot down his experience.

In reply to a question by Mr. J. A. Spencer,

Mr. Wilkinson explained that the filtered and sunned rain water to be added to the bath must previously have had a portion of nitrate of silver dissolved in it

Mr. F. York had never been able to use nitrate of silver for printing which had previously been used for taking negatives. He had tried to get rid of the iodide by adding citric acid, but found that method utterly useless.

Mr. Wilkinson said that the iodide could be got rid of by crystallisation.

Mr. Spencer explained that when the nitrate of silver was crystallised out all the iodide remained in the mother liquor, and it was only necessary to wash the crystals in distilled water to ensure their being entirely freed from iodide.

Mr. E. W. Foxlee considered that it would have made the matter plainer if Mr. Wilkinson had said that it was necessary to boil down the bath to the crystallising point.

Mr. Ashman found that by adding nitrate of barytes to a bath, as recommended by Mr. A. L. Henderson, freedom from pinholes and similar defects was always ensured.

Mr. York corroborated this statement, and gave some instances which had occurred in his own practice of "sandy" baths having been completely cured by that addition, five grains of nitrate of barytes to the ounce of solution having been added with excellent effect.

Mr. Wilkinson also testified to the usefulness of the barytes.

Mr. Brooks gave his experience with carbonate of soda. If it were added to a bath until there was a good precipitate, and the bath were

then boiled, it would be alkaline, and while in this condition would work well and with great rapidity. The carbonate of silver formed seemed to have the effect of precipitating the iodide that formed the pinholes. The bath, however, soon got out of order after such treatment—becoming acid, and requiring to be again rendered alkaline.

Mr. Ashman observed that the nitrate-of-barytes method of treatment answered better and was more lasting in its effects. A bath containing this salt could be used in either a neutral or alkaline condition.

Mr. Brooks having recommended nitrate of iron as a developer instead of the sulphate,

Mr. Spencer said that the nitrate of iron had been used by Dr. Diamond for developing collodion positives more than twenty years ago.

Mr. Brooks observed that formic acid was also a useful addition to the developer; but it was frequently sold in such a dilute condition as to be worthless and misleading. Its action was something like that of methylal—a substance which could not be obtained.

Mr. L. Warnerke said that methylal was now an article of commerce, and the right substance could be obtained under the name of "photographic methylal."

After some further observations a vote of thanks was tendered to Mr. Wilkinson, and the proceedings terminated.

MANCHESTER PHOTOGRAPHIC SOCIETY.

The monthly meeting of this Society was held at the Memorial Hall, on Thursday, the 9th instant,—Mr. W. T. Mabley, President, in the chair.

After the routine business Mr. J. Pollitt read a paper on *Prolonged Exposures by the Wet-Plate Process* [see page 124], and handed round some negatives exhibiting the marks and defects alluded to in his paper; also a carrier for wet plates during long exposures, and some capital prints from negatives exposed from half-an-hour to two hours and three-quarters.

In reply to Mr. A. Brothers,

Mr. Pollitt said the longest time he had kept a wet plate moist by putting wet blotting-paper behind it was two hours and three-quarters.

Mr. Wade exhibited a number of large and excellent photographs of Californian and American scenery, by Mr. C. E. Watkins and Mr. J. A. Taylor, of California, kindly lent by Mr. Taylor, of Princess-street, Manchester.

The usual votes of thanks closed a very interesting meeting.

WEST RIDING OF YORKSHIRE PHOTOGRAPHIC SOCIETY.

The ordinary monthly meeting of this Society was held on Monday evening, the 6th instant, at the Commercial Hotel, Bradford,—Mr. J. Smith, President, in the chair.

The minutes of the preceding meeting having been read and confirmed,

The Chairman introduced Mr. Tilley, of Stafford, to the meeting, who had attended for demonstrating his method of producing combination negatives directly in the camera.

Mr. Tilley had brought with him a skeleton model studio, fitted-up exactly after the manner of his own studio, with curtains and backgrounds, a doll representing the sitter. By the aid of the model he gave a full description of his method of manipulation, going through each operation as he explained it in his model studio, demonstrating the extreme ease and simplicity with which the combined negative could be produced. He then handed round his dark slide, with its arrangement for placing the transparency in position, for the inspection of the members. A large number of prints from negatives produced in the manner shown were exhibited, including a number of enlarged transparencies, to which Mr. Tilley drew special attention as being a very important illustration of the advantage of his method, as by no other process extant could enlarged prints with natural backgrounds be produced without the use of marks, registration frames, or some other of the ordinary methods of combination printing. In enlarging from negatives produced as he described nothing of the kind was necessary, as no join of portrait to background could be perceived, and the background must necessarily be in keeping with the portrait both as regards intensity and harmony of tone. He also showed how the operator had perfect control over the quality of the background, as it could be produced in or out of focus, and any degree of atmospheric effect could be attained. He (Mr. Tilley) likewise demonstrated a second method of producing combination enlargements by the use of a hinged box similar to an opal printing-frame with an extra front attached. By using a double plate, taking the portrait on one half, then drawing the curtain over the sitter and exposing the other half, he obtained a mask of the sitter (both being taken with the light background). From the mask thus obtained he produced by contact printing a reverse mask, transparent in the background and the shape of the portrait opaque. By then adjusting the portrait and mask in the hinged box or slide he turned the mask away from the portrait and exposed for the portrait; then, removing the portrait negative, he replaced it with a landscape, and, shutting the mask upon it, exposed for the background. The mask effectually blocked out the figure, the result being a perfectly-combined negativ

At the close of Mr. Tilley's remarks,

Mr. Crosthwaite (one of the Secretaries) said he had pleasure in testifying to the ease and rapidity with which the combined negatives were produced, as he had that afternoon had an opportuniy of practically testing the invention with Mr. Tilley's model by taking several combined negatives, and he was convinced that, though it might appear somewhat complicated in type, yet in practice nothing could be easier, the combination negative being produced as quickly as most operators would produce an ordinary double-plate negative.

The members generally expressed their entire satisfaction with the method, and on the motion of Mr. Sachs a most cordial vote of thanks was tendered to Mr. Tilley for giving the members an opportunity of seeing his valuable invention.

Mr. Sachs then laid on the table a number of photochromes, the production of M. Leon Vidal, and which have been so enthusiastically described by the French correspondent of the Journal.

Mr. M. E. Batho said the process was one very closely allied to chromolithography, and depended upon layers of different coloured tissues superposed one on the other. A negative was produced for each colour, in the same manner as a stone was required for each colour in lithography. A print was produced from each in the requisite coloured tissue, developed, and put together. He (Mr. Batho) considered that chromolithography would favourably compare and seriously compete with it.

On inquiry from the members as to price,

Mr. Sachs read the price-list of the pictures as forwarded to him. M. Vidal required an annual licensing fee of 500 francs, and undertook to produce the pictures for his licensees at the following rates:—Six *cartes* for thirty francs, twelve for forty francs, and twenty-four for sixty francs; six cabinets for sixty francs, and twelve for eighty francs; larger sizes proportionately.

Several gentlemen expressed their astonishment at the prices stated, taking into consideration the quality of the pictures, as there was a great lack of detail, particularly in the faces of the portraits, and they could not in any way compete with hand-coloured work, which could be produced at a cheaper rate than the photochromes for small orders.

Mr. Sachs could not see the utility of the method of production, as there were so many different colours in the pictures. It was a serious undertaking to produce a *cliché* for every little coloured object that might appear in the picture.

Mr. Batho said it would not be always necessary to produce a separate *cliché* for each colour. In chromolithography the effect of a third colour was often produced by the overlapping of two other colours, and the same method was applicable to photochromy.

It was also noticed that they failed very considerably in rendering the delicate flesh tones; indeed, the flesh was represented by almost a flat tint with a little colour on the cheek. Attention was drawn to the fact that under a magnifier it presented the exact appearance of a brush stipple, or the grained texture of a lithographic stone.

One member considered it would be very difficult to obtain negatives for the production of the greys in the face, as the negative possessed considerable opacity in those portions.

Mr. Cook was of opinion that the leading thought of M. Vidal was to perfect a method of printing in colours by the aid of photography without the aid of artistic skill in applying the colours. In the published method such was the case, what was required by the workman being merely mechanical ingenuity and skill. The process might be useful for price lists and catalogues; but it was not, in his estimation, capable of producing a portrait or work of art.

Mr. Wormald thought the picture was simply a gelatine transparency on a coloured foundation produced by chromolithography.

The Chairman said that as the process was as yet in its infancy it was wise to withold any very decided expression as to its merits, as it might, in the course of time, grow to something of nobler proportions. He scarcely thought the pictures were produced by the method announced in the journals; and he was of opinion that the gentlemen who had so praised the process could not have been sufficiently well informed on the subject if the pictures before him were to be taken as fair specimens of the capabilities of the process.

On the motion of Mr. Wormald a vote of thanks was presented to Mr. Sachs for his kindness in procuring the specimens, which he had done at considerable trouble and expense, and to Mr. Batho for his short descriptive outline of the process.

Mr. Sachs, in replying, said he was much disappointed with the pictures, as from the published statement he had expected something much better.

The meeting was then adjourned.

BERLIN PHOTOGRAPHIC SOCIETY.

At a recent meeting of the above Society, Dr. Vogel showed a number of drawings of *renaissance* furniture, some pieces of which were considered very suitable for glass-house accessories.

The probable cost of a visit to the Philadelphia Exhibition called forth some reminiscences of hotel life in America from the President. On the motion of Herr Meyer it was resolved that the Society should purchase from the widow of the late Dr. d'Henreuse all his manuscripts relating to photography, heliography, &c.

Herren Oldenburg and Reichard, who were deputed to remonstrate with the police about the notice served on the Society at its last meeting prohibiting the formation of a widows' fund on the proposed basis, made their report. Since the order was issued the official who had issued it had been succeeded by another, and the new comer had not yet been able to study the contested point; but they (Herren Oldenburg and Reichard) had had an interview with Dr. Züllmer, who is manager of a life assurance society and has a good deal of influence with the police, and he had explained to them that the proposed rules could not be sanctioned because should the number of the members of the Society decrease considerable injustice would be done to the last surviving members, as the fund would act like a tontine, only that instead of the last survivor getting the accumulated funds he would have to pay the full sum for which the insurance had been effected to the widow of the next to the last survivor, and his own widow or heirs would reap no benefit from his connection with the fund. Dr. Züllmer had also kindly offered to draw up a set of rules, involving small annual payments, likely to meet the wishes of both the Society and the police.

The discussion then turned upon various details of the carbon process, after which the following questions were answered thus:—

Can an enlargement be painted all over with china ink without injury? Indian ink exerts no chemical action upon photographs and does not change with time; zinc white and the colours mixed with it, on the contrary, soon become yellow.

Is grape sugar used in the developer? and, if so, does its reducing power act advantageously?

Dr. Vogel remarked that grape sugar was only a powerful reducer in the presence of ammonia.

Herr Prümm had tried grape sugar and gelatine in the developer without obtaining any benefit from so doing.

There are now in the market many photographs the heads of which are cut out, pasted on to a plate of glass, and finished with a deep black background of asphalt varnish. How is it that these pictures frequently soon become yellow?

It was supposed that the adhesive substance used had a deteriorating influence upon the pictures.

In order to recover as much silver as possible is it better to trim the pictures *before* or *after* fixing them?

It was remarked that the pictures were trimmed exactly in few establishments before being fixed, but that, generally speaking, the edges should be pared before toning—not only on account of the silver being thus more easily recoverable, but also on account of the not inconsiderable saving of gold.

With the answering of these questions the proceedings terminated.

At the last meeting of the same Society the description of a secret process for obtaining beautifully-modelled portraits without having recourse to retouching having been read, it proved to be neither more nor less than the well-known process by which what are known as "Denier's effects" are produced. It was accompanied by so beautiful a specimen portrait that the greatest doubts were expressed as to its being really produced without the aid of the retoucher. [In commenting on this and similar secret processes, the *Mittheilungen* deprecates the foolishness of those persons to whom the price of a photographic journal seems an insurmountable barrier to their becoming subscribers, yet who allow themselves to be persuaded into paying three or four times as much for a secret process which eventually turns out of no use to them, and which they would have probably been acquainted with long before had they only perused with care any one of the despised journals.]

The President then showed a model in cardboard of Baron des Granges' tent, which raised a discussion as to the most suitable form of bath for a travelling tent.

Herr Boll described his travelling apparatus the whole of which packs into a box and weighs about sixty pounds.

The President then laid on the table a handsome present sent by Dr. Hornig to the Berlin Photographic Society. It consisted of a copy of his *Year-Book* for every member of the Society.

Herr Linde then showed some cabinet portraits in carbon of the Pope, executed by M. Braun, of Dornach. On its being remarked that these were large pictures to be done in carbon,

Herr Prümm said that Herr Sala, Unter den Linden, was exhibiting a very masterly carbon enlargement, apparently taken from the same negative, which was five feet high, and was, perhaps, the largest carbon print ever made.

Herr Schaarwächter showed a transparency for a window. It was simply a carbon picture transferred upon ordinary transparent glass, the side on which the picture was being laid upon a sheet of ground glass having a border round its edge and surrounding the picture. The effect was said to be particularly good.

At a former meeting there was a discussion upon whether it was most profitable for a photographer to sell his residues or to reduce them himself, in the course of which Dr. Weissenborn undertook to make some experiments with the reduction of residues and to communicate the results, which were briefly as follow:—He usually paid from two and a-quarter to two and a-half marks per pound (two shillings and three pence to half-a-crown) for paper containing silver, and about forty marks (two pounds) for dried chloride of silver. For the present experiment he took a pound of paper parings, filter paper, &c., and, having reduced them to ashes, boiled them down with nitric acid, and precipitated with salt, obtaining in this way eighty-six grammes of dry chloride of silver, containing, as shown by its atomic weight, sixty-four grammes of metallic silver. The result then stood:—

The paper containing silver sold as such for	2,50 marks.
The chloride of silver obtained therefrom sold for..	6,88 „
The metallic silver, valued at about 80s. per lb. ..	10,24 „

From the two last items the cost of reduction has, of course, to be deducted; still the value of the waste when sold as metallic silver shows most advantageously beside the same waste sold as such.

Herren Schaarwächter and Kannenberg said that such filter paper, &c., as Dr. Weissenborn had experimented with usually brought about 4,58 marks per lb., and chloride of silver 48 marks.

Herr Prümm thought Dr. Weissenborn's sample must have been unusually rich in silver, as when he reduced wastes his average fell far below that, and generally every scrap of paper containing even a trace of silver was sold. Then the chloride of silver was never pure. He had in some cases found even as much as 50 per cent. of kaolin earth mixed with it. He was of opinion that, generally speaking, the reduction of paper waste to chloride of silver is attended with loss, because few photographers have Dr. Weissenborn's chemical skill, and if one do not possess all the requisite apparatus one is apt to allow some ten per cent. to escape by the chimney. He himself invariably sold all his waste, and thought that he lost little, if at all, by so doing.

Dr. Weissenborn undertook to reduce a sample to be sent to him.

The proceedings were then terminated by a notice of a festive meeting, to take place some time this month.

Correspondence.

HENDERSON'S ENAMEL PROCESS.

To the Editors.

Gentlemen,—With reference to your account of the enamel process as practised by me which appears in The British Journal of Photography of this morning, permit me to explain that the process I have patented is *not* the same as that by which I have been producing enamels during the past ten years, but is in every essential feature different from, and a most marked improvement on, that in use hitherto.

The new process which I have patented is the result of many thousand experiments in which I have been engaged during several years; but it is only lately that I have been enabled to bring the process to such a state of simplicity and perfection as that of which you were a witness on the day when you favoured me with a visit and saw the whole operation from begining to end. It is the process witnessed by you in operation that I have patented, not that by which I have so long worked, and which is so inferior to the new one that I think of now discarding the former altogether.

I can mention the names of several who are likely to assert that they have practised my method of enamelling for years, and am fully prepared to hear of several more; nevertheless, I have before me all that has been published on the subject, including the processes of Watson and Solomon.—I am, yours, &c., A. L. Henderson.

49, *King William-street, March* 10, 1876.

To the Editors.

Gentlemen,—Of the subject of patents, especially photographic patents, your readers must recently have had enough, *usque ad nauseam*.

In your leader of last week, nevertheless, you speak of yet another patent which has just been taken out by Mr. A. L. Henderson, for securing the process by which for several years that gentleman has obtained, not only very deserved celebrity, but also, it is to be presumed, very considerable commercial success. He now, as I understand, purposes to make known the whole of the details of the method by which he has obtained the results which have been so much admired, and which many photographers and others have long desired to know. In publishing this process he desires, as I read your article, to preserve to himself for a certain term of years, by taking out a patent, the advantages by which he has already secured to himself fame and profit, while imparting to the world the method by which these results have been obtained.

The subject of patents having been the object of my attention and study for some years, I think I am in a position to show that Mr. Henderson is mistaken in his views if he think that he will attain the object of his wishes. In the first place, a patent to be valid must be *new*, and this can hardly be the case if the process which he describes in his specification has been worked by himself for a certain term of years successfully, although the invention may be entirely his own.

In a recognised work on patents,* by Mr. James Fraser, among others the following are laid down as fundamental rules governing the issue and validity of patents:—1. *Novelty* is an essential condition of a

* *Handybook of Patent and Copyright Law.* By James Fraser, Esq. London: Sampson, Low, Son & Co., 47, Ludgate Hill. 1860.

patent. 2. An invention must not have been publicly used, *either by the inventor or other persons*, prior to the patent. 3. If the secret of an invention be known only to a few persons, *and one of them has put it into practice*, and made actual public use of it, then a patent afterwards obtained by any one of them is void. 4. An inventor possessed of a secret invention, who shall for a period of years retain the monopoly, and *sell the produce of his invention publicly*, cannot be allowed afterwards to take out a patent for it, since he would thus derive from his invention more benefit than could be obtained during the lawful period of fourteen years—a system which, if encouraged, would materially retard the progress of science and art.

Now, although I do not grudge Mr. Henderson one *iota* of the fame and profit he has undoubtedly gained from the practice of his very beautiful process, I am afraid he will be disappointed in his expectations in taking out the patent, which he has been badly advised to do, since he will have resigned the power he possessed while he practised it as a secret process, although he cannot lose the celebrity which has attached to his name through the exercise of it. He must, however, be content to share the commercial benefit of it with those to whom he imparts the details through the medium of the Patent Office.—I am, yours, &c.,

London, March 13, 1876. SCIO.

["Scio" will perceive from the preceding letter from Mr. Henderson that the process patented by that gentleman is not the same as that by which he has hitherto been producing enamels. Not being conversant with the details of the former method we assumed that the process we saw worked with so much success was the same as that hitherto employed, but this, as will be seen from Mr. Henderson's letter, was a misapprehension.—EDS.]

ORGANIC PYROXYLINE.

To the EDITORS.

GENTLEMEN,—If Mr. Batho has any *facts* to state let him do so. I cannot ask you to allow me space to answer his *opinions*, which are probably of as little moment to the general body of your readers as to—Yours, &c., H. STUART WORTLEY.

March 14, 1876.

THE REACTIONS IN DOUBLE DECOMPOSITIONS.

To the EDITORS.

GENTLEMEN,—In reply to Mr. H. Berkeley's query contained in his letter in your last issue but one, I cannot do better than give him the accompanying extract from Miller's *Chemistry*, last edition, by which he will see that the thermal units of heat liberated by each reaction form an important function in chemical reactions.—I am, yours, &c.,

Chatham, March 13, 1876. W. DE W. ABNEY, *Capt. R.E.*

"DOUBLE DECOMPOSITION.—It has been ascertained to be a fundamental rule in the double decomposition of two compounds that the reaction always takes place in such a manner that the greatest amount of heat is developed. This serves to explain many hitherto incomprehensible reactions; for instance, when hydriodic acid acts on argentic chloride, mutual decomposition takes place, notwithstanding the attraction of chlorine for silver is greater than that between iodine and silver. An examination of the thermal phenomena at once points out the proximate cause: the reaction is $HI + AgCl = HCl + AgI$; but $(H + I + Aq) + (Ag + Cl)$ and $(H + Cl + Aq) + (Ag + I)$ 15,004 units + 34,800 units and 40,192 units + 18,651 units. Hydrogen combining with iodine in the presence of water to form hydriodic acid developes heat amounting to 15,004, and silver where it unites with chlorine 34,800; on the other hand, hydrogen and chlorine in the presence of water produce 40,192, and silver, in combining with iodine, 18,651. In the first instance the total amount of heat developed is 49,804, in the latter 58,843, being a difference of 18,651; so that, when hydriodic acid acts on argentic chloride, hydrochloric acid and argentic iodide are produced, and at the same time heat is developed equivalent to 18,651 thermal units."

ANSWERS TO CORRESPONDENTS.

☞ *Correspondents should never write on both sides of the paper.*

⁂ We regret to have this week again to apologise to several contributors whose communications we have had at the last moment to leave over owing to press of matter.

H. B. B.—Received.

AMATEUR.—We do not know the price of the work.

J. M.—We shall be glad to see the work as soon as published.

J. B. BEST.—Thanks for the formula, which we shall lose no time in trying.

DON CÆSAR.—The larger of the two diaphragms will admit four times more light than the smaller.

L. WARNERKE.—As the speediest way of enabling you to procure the desired information we shall forward the Journal containing the article.

ANXIOUS.—The whole-plate lens will be the best adapted for taking the group of children, but you will not be able to use it with full aperture. An inch-and-a-half stop will probably be required.

C. H. F. C.—The best lens for the purpose specified is one by which the greatest degree of sharpness is produced at the margin of the picture, totally ignoring the central definition. As the field will be "round" you must focus the margin. An old quarter-plate portrait lens of good quality, made prior to the introduction of *carte* lenses, will be suitable.

A. B.—The only suggestion we can offer respecting the best method of producing a very dark background to a photograph of an engine is to suspend behind it, while it is being photographed, a very dark cloth.

A MEMBER OF THE SOUTH LONDON SOCIETY.—Nitrate of barytes, as an addition to the silver bath, has now been before the public for a period of three or four years, and the good services rendered by it have been universally recognised.

T. GULLIVER.—The proportions are—four parts of chalk and one part of carbonate of magnesia made into a stiff paste with gum water. It must be beaten in a mortar. We have not yet received any description of Mr. Young's oxygen making apparatus.

S. B. DRAPER.—The lens you use in the production of enlargements is of too long focus to enable you to arrange the room in any other way than it is at present. We strongly advise you, for optical reasons into which we need not here enter, to discard your present objective for one possessing an equivalent focus not exceeding nine inches, although it may be one or two inches less than this.

GREY FRIAR.—The refusal of the prints to tone is due to the acidity of the printing bath. Pour it into a bottle, and add a solution of carbonate of soda until the carbonate of silver at first produced ceases to become dissolved, and deposits a slight precipitate. It will be better to dilute the solution to a considerable degree, as a sensitising bath of a hundred grains to the ounce is unnecessarily strong.

N. W. FRITZ.—It will, of course, be requisite for you to obtain a tent; a small one of the "box" kind will be most convenient. Had you possessed more experience we should have recommended a Howard's tent, but as a beginner you would not be able to manipulate in it at first with the requisite dexterity. With a landscape lens of about seven inches focus and medium stop you will be able to obtain negatives with an exposure of a few seconds.

A. NEOL.—The Wothlytype process is not so well adapted for aiding in the production of prints on wood for engraving as the carbon process, which by single transfer gives a reversed picture. The following is the method we usually adopt:—Having sensitised a piece of tissue of a suitable kind, it is exposed, and after being made wet it is pressed in contact with the boxwood block. The back of the tissue is now sponged with warm water, and when the gelatine has become sufficiently soft to permit of the withdrawal of the tissue a gentle stream of warm water is allowed to fall upon the surface of the wood until the details have become properly developed. When dry it is ready to be handed to the engraver.

RECEIVED.—Miss Logan; Hospital Sergeant. In our next.

NEW LANTERN READINGS.—Of the recent visit of H.R.H. the Prince of Wales to India much—indeed very much—has been written. It has proved a fertile theme for the descriptive pens of ready writers. Among the works which have been prompted by that visit is an excellent lecture, published by Mr. F. York, to accompany a series of nearly eighty photographic views of numerous interesting scenes and places visited by the Prince during his recent tour through India, including some scenes on the passage *viâ* the Suez Canal. These photographs, we need scarcely observe, are in the form of transparencies intended for exhibition by the magic lantern. The lecture is well written, and will be appreciated by even the most fastidious elocutionist. We have also to acknowledge another of Mr. York's *Lantern Readings—The Falls of Niagara*—written by the Rev. J. Comper Gray, and intended for use in connection with a series of forty views of these Falls. Like the lecture alluded to above, this also contains a large amount of useful information compressed into a very small compass.

IMPROVED LENSES.—Mr. M. P. Tench, of Fleet-street, has submitted to us for critical examination and report two lenses of his production. One of these has been manufactured for a colonial photographer, and is one of those characteristically designated "a baby lens;" that is to say, it possesses a very large aperture in comparison with its focus. The diameter of the lenses being three and a-half inches and the back focus six inches, it will be inferred that the volume of light transmitted is very great. In the construction of a portrait lens for general use it is desirable that it possess as large a degree of angular aperture as is consistent with its also having a fair amount of depth of defining power and embracing a moderately-large angle of view. In "baby" lenses angular aperture is the all-important point to be attained, because on this depends the intensity of the light which forms the image in the camera, and consequently the shortness of the exposure. As Mr. Tench's lens works with full aperture, it will easily be understood that the exposure required will be very brief. When tested in this way we found the definition most excellent. When a diaphragm of two and a-half inches aperture is inserted it then becomes a quick-acting *carte* lens, possessing all the depth of focus required in such instruments. The great utility of "baby" lenses for specific purposes is too well recognised to require from us a single word of commendation. The second of the lenses referred to is one of the "planographic" series, the curves of which are so modified as to yield a sharp image with full aperture, and free from the flare peculiar to so many lenses of a similar character.

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THE BRITISH
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A NEW DRY-PLATE CAMERA.

In the course of conversation during a recent visit paid to us by Mr. John J. Atkinson, of Liverpool, that gentleman mentioned that he had with him in London a dry-plate camera of a peculiar construction that he had just brought from France, and which he thought would add greatly to the comfort of dry-plate workers. We have since been afforded an opportunity of examining the camera and testing its various actions, of which we now proceed to give a brief description.

First of all it resembles, both in its general character and in several of its details, a camera which was brought under the notice of the Edinburgh Photographic Society in the beginning of last year by Mr. Aird, inasmuch as the plate box is situated below the camera, of which, indeed, it may be considered as an integral part. The plates are fixed into light wooden frames before being placed in the box, each frame having its own separate groove. By means of rods at each side of the back of the camera any particular plate of the twelve contained in the box may be selected and elevated into position by means of a pinion working into the rods, which for this purpose are toothed.

A very ingenious method has been adopted for indicating whether any particular plate has or has not been exposed. On the top of the box is a small metallic plate perforated with twelve holes, which are numbered; underneath each of these is a short wire or stud-point which is passed upwards by the frame containing the plate, and can be seen or felt; but in practice a slip of paper is laid over the holes and a perforation is then made. Each plate frame is numbered, and the action of the perforating point is such that it corresponds with its own plate, even if the plates were placed in the plate-box in a miscellaneous manner. The perforation of the paper acts as a simple and permanent record of the number of plates exposed.

The plate-box is screwed to the camera-stand, and the aperture or slit in the camera through which the plates are made to ascend and descend is brought opposite any of the twelve plate-frames by means of a rack and pinion. The camera is provided with a bellows body, and possesses great range of focal adjustment. The base-board folds up and acts as a cover to the front; this board, being hinged at the bottom, folds down, and is retained rigidly at a right angle to the camera by means of struts, much in the same manner as Cook's patent camera, which, like Aird's camera, possesses several features in common with that which forms the subject of the present description.

On the whole we gladly welcome this addition to the apparatus now accessible to the dry-plate photographer. From its elaborateness of finish and details it must necessarily prove more expensive than most cameras at present in use; but it must be borne in mind that it possesses in itself the equivalent power of six double dark slides, the plates in any of the holders being brought up from the box below and presented to the action of the light admitted through the lens with unerring precision—a point of which we have become assured by actual trial.

Although the specimen we have seen is intended for 10 × 8 plates, we understand it is the intention of Mr. Atkinson to import cameras of smaller dimensions.

A CONVENIENT METHOD OF DEVELOPMENT FOR DRY PLATES.

We had occasion, last summer, in speaking of Lieutenant Plucker's method of development by means of ammonia vapour, to mention that process as promising peculiar advantages to the travelling photographer, not only on account of the facilities it affords for development *en route* without the trouble and inconvenience of the ordinary solutions, but because with a minimum of trouble the whole of the plates exposed may be at least partially developed each evening, so as to render it certain before leaving the neighbourhood that any particular subject has been secured, and also during a lengthened absence from home to remove any risk which might arise from the postponement of the development. In consequence of further experience since that article was written, and in view of the near approach of another campaign, we propose to jot down a few hints which will enable our readers to practise this system with the greatest degree of certainty and success and in the least troublesome manner.

It will be in the recollection of our readers that M. Plucker's method is based upon the exposure of the impressed film to the action of ammonia vapour after having been slightly moistened or softened by breathing upon it. Many previous attempts have been made to secure the desired effect by first treating the film either with water, alcohol, or solution of pyrogallic acid; but under such circumstances the action of the alkali was so irregular and so little under control that no practical result has hitherto been attained. The slight moistening effect produced by the application of the warm breath to the surface of the film was, however, found to be quite sufficient to bring the film within the action of the alkali, while, at the same time, it was insufficient to produce the fog which had previously been the insurmountable difficulty in the way of success.

But it is well known that with many varieties of dry plates the application of an alkali alone is incapable of originating any developing action, and in such cases the method is wholly inapplicable. It is, however, a matter of the greatest ease to so modify the preparation of the plate as to render it accessible to the developing action of the ammonia vapour. This is effected by the employment in the preservative of one of the reducing agents, such as tannin, gallic or pyrogallic acids. In most cases, if the pyroxyline be of a suitable description, the first two, either alone or in combination, will be found sufficient; but in other cases it may be necessary to use pyrogallol. Plates prepared with the bath, and subsequently treated with a preservative containing tannin, which may be either dried on or washed off at pleasure, will be found to develope with the greatest ease, and the same may be said of emulsion plates prepared with excess of silver if the pyroxyline be of the right sort; but emulsions prepared with excess of soluble bromide will frequently require a wash of pyrogallic acid, the developing effect of the other two substances proving insufficient under the circumstances.

For plates prepared with the bath the best preservatives to employ are tannin or gum and gallic acid, though excellent results are also given by coffee. For plates containing iodide the tannin solution should not be too strong—five or six grains to the ounce being ample; if increased much above that strength the contrasts are apt to be too harsh. For simply bromised plates ten or twelve grains to the ounce may be used. The gum-gallic mixture may be the same for either description of plate. The best organifiers for emulsion plates are found to be tannin, coffee and gallic acid, and the mixture of tannin, gallic acid, and grape sugar recommended by Mr. Verity many years ago. With washed emulsion two courses are open—either to apply the organifier to the moist pellicle before washing, or to add it to the final emulsion. Either will give good results; but the effect of the organifier is not so marked in the former case, while in the latter, if the emulsion is to be kept long, the presence of pyrogallic acid might be objectionable. If the latter substance be added directly to the emulsion the greatest care should be exercised in order to avoid the slightest alkalinity of the mixture, or fog and discolouration of the emulsion will be the inevitable result. If the emulsion be prepared with free silver it will be sufficient to treat the moist pellicle with one of the organifiers mentioned above, with the addition of one drachm of glacial acetic acid to three or four ounces of solution. If, on the contrary, the soluble haloids have been in excess, the best plan will be to dissolve half-a-grain per ounce of pyrogallic acid in the emulsion, precautions being taken to ensure its neutrality.

We now come to the operation of development itself. This is performed in the simplest manner by providing a light framework, like a shallow box without bottom or lid, and of such a size that the plate will just fit into a rebate provided for it upon the upper edge, so as to form a movable lid. The plate, having been gently breathed upon, is placed face downwards upon the frame, and the whole placed over a sheet of bibulous paper or cloth saturated with solution of ammonia. In this manner it is possible to watch the operation of development through the back of the glass, and to stop it at any moment when the proper effect shall have been produced. It frequently happens that the damping effect of the breath will pass off before the development has time to commence, so that it becomes necessary to repeat it. If, therefore, no change take place in the appearance of the plate, and there be no reason for supposing that the exposure in the camera has been insufficient, or if the progress of development should lag, remove the plate and repeat the breathing, taking care not to carry it so far as to cause the moisture to conglomerate in beads upon the film.

We have made several experiments with the object of ascertaining the possibility of retaining a sufficient quantity of moisture in the film, to obviate the necessity for breathing upon the glass, and, provided the plates are not required to be kept long or exposed to any great changes of atmosphere, we find the object can be attained; but we should not recommend the adoption of such a course where the plates have to be carried on a long journey. The desired effect is produced by the addition of a certain quantity of hygroscopic matter to the organifier or to the emulsion, as the case may be—the substances we have employed being glycerine and sugar. The first we added to the preservative in the proportion of one drachm to ten ounces of the solution, together with one hundred grains of loaf sugar. Of course, the exact quantity necessary to produce the best result—or, rather, to produce the *desired* result without injuring to any great extent the good qualities of the film—will vary with the season of the year as well as the temperature, more being required in summer or hot weather than in winter. If the addition be made to the emulsion it will be well to use only glycerine, from one-half to one drop to each ounce being generally sufficient.

As regards the source of the ammonia vapour, we have tried several modifications of the original plan recommended by M. Plucker, but find nothing better, for general purposes, than a piece of thick bibulous paper or cloth saturated with diluted ammonia. The strength of the ammonia will depend greatly upon circumstances. If the plates are to be developed singly, and watched throughout the whole course of the operation, the ammon may be tolerably strong; but if several are developed at the same time it will be necessary to use it in a much more dilute state, in order that the action may be less energetic and more under control. The distance of the exposed film from the ammonia-saturated surface will also be found to have a distinct bearing upon the proportionate activity of the development. It will, therefore, be necessary to use a stronger solution as the distance between the two surfaces is increased. We have also tried fuming dry pads of felt cloth, such as are used in the printing-frame; but these are troublesome on account of the rapidity with which they lose effect. Freshly-powdered carbonate of ammonia acts effectively and with great regularity; but its employment is not recommended upon economical grounds.

We have spoken previously of the development of several plates simultaneously—a plan which, if carried out judiciously, will prove of great use. Of course the development of a number of plates by this method at one and the same time, each in its own frame, is no more difficult than would be the case if dishes and the ordinary solution were used; but this style, in which each plate requires constant watching, we do not refer to. In the old days of the collodio-albumen process it was customary to develope several negatives at once, the length of time occupied in the operation precluding the possibility of watching each individual plate. It is upon the same principle we propose now to work, viz., a slow and uniform development which will permit half-a-dozen or more plates being developed at once without danger of over-action, while, at the same time, facilities are afforded for the examination of each plate during the progress of the development.

Our first trials were made with an ordinary grooved plate-box, which was considerably longer than the plates, the grooves ceasing at such a distance from the bottom as just to permit the plates to drop below the top of the box. This arrangement secured a vacant space at the bottom of the box, in which was placed a small saucer containing dilute ammonia, the plates were slid into the grooves, and the lid closed. This, however, was found to be defective in many ways. The vapour did not circulate freely and uniformly over the whole surface of the plates, the lower edges being developed much more rapidly than the other portions; the films could not be kept moist without constantly taking them out and breathing on them; and, finally, each time the lid was raised, in addition to the unpleasantly-strong odour which escaped, the ammonia vapour became rapidly exhausted. It thus became evident that the perpendicular grooves were incorrect, that the system of breathing upon the plates was insufficient for the purpose under these circumstances, and that there was not sufficiently ready means of examining the plates during the development.

After some little trouble, however, we hit upon a plan which succeeded perfectly. Instead of breathing upon the surface of the plate, the effect of which soon disappears, we resolved that the ammonia solution itself should produce the necessary softening effect, and succeeded after one or two trials in compassing that result by mixing the ammonia with methylated spirit instead of water—one part of ammonia in sixteen of spirit. In place of the arrangement of perpendicular grooves we substituted an ordinary plate-box laid upon its side so that the plates should rest in a horizontal position. In each alternate groove we placed a plate carrying a piece of blotting-paper saturated with the alcoholic solution of ammonia, and in the intervening spaces were inserted, face downwards, the plates to be developed. The lid being closed the developing action went on slowly and uniformly, and when the box was opened to examine the plates the escape of vapour was very slight. In this manner, if the ammonia solution be of the right strength, it is possible to develope a number of plates simultaneously without the slightest danger of overdoing it or producing fog, and without the use of the ordinary solutions and their concomitant troubles. When travelling the developing-box may be utilised for packing purposes, so that very little need be added to the bulk of luggage. After development the plates should be exposed to the air for a few minutes, in order that any trace of ammonia may escape and the film become hard, when they should be carefully packed in light-tight packages and preserved for future intensification.

This method, which we have said is principally useful for tourists, is suitable to any process to which the ordinary alkaline developer is applicable, and serves, as we stated in the early part of this article, to secure the negative on the spot. The faint image thus obtained will remain for months at least in good condition, and may be afterwards intensified either by means of alkali or acid silver. The films must, in the interim, be shielded from light and damp with as much care as if undeveloped.

ON RESTRAINERS.

We presume it may be taken for granted that, notwithstanding all that has been written on the theory of the invisible image, we are still very much in the dark respecting it, or at least that no really reliable evidence has been adduced by which the question is likely to be finally settled. This much seems generally admitted—that, whatever may be the change brought about by light, the actual production of the image on a film of iodide of silver is due to the adhesion of metallic silver on the parts on which the light has acted, and variously on those parts in proportion to its intensity. It is also well understood that the metallic silver is in such circumstances obtained from the decomposition of the nitrate of that metal, which adheres to the surface of the plate in the case of wet collodion, or from that which has been added to the developer on washed films—a decomposition that is generally brought about by the action of a reducing or deoxidising agent. In the case of a bromide of silver film it is equally well known that with alkaline development the image is produced by the decomposition of the haloid salt itself. The processes are thus distinctly different, although they possess several properties in common—one of which is the fact that in both cases the action of the developer requires to be restrained to prevent the metallic deposit adhering to every portion of the film, and so producing what is so well known as "fog."

It is, therefore, a question of no little importance how best to prevent the fogging of the plate under development. For this purpose three very different classes of bodies have been somewhat extensively used, namely, oxidising substances, such as certain acids; organic bodies, such as beer, gelatine, &c.; and soluble bromides of the alkaline metals. Undoubtedly the most popular and generally-used restrainer—in working wet collodion, at least—is acetic acid; but, as the result of many experiments, we are satisfied that an organic body might be substituted with much advantage.

Shortly after the introduction of beer as a preservative of dry plates it was found that they could be developed with alkaline pyrogallic acid without any restraining bromide, and since then we have frequently used sweet ale without either acid or bromide. We know that several photographers in large practice use it regularly, and who maintain that they thereby can give shorter exposures, while they secure finer detail and a more non-actinic colour in their negatives—in fact, get somthing like the "bloom" of the old pyro. development.

Instead of beer, gelatine has been recommended as a restrainer in both systems of development; but we certainly did not find it answer the purpose; and from the fact that gelatine emulsions are as subject to fogging as collodion plates we hardly think the claim can be sustained. When, however, as has both recently and long since been shown by our esteemed *confrère*, Mr. M. Carey Lea, gelatine has been acted on by sulphuric acid a compound is formed that possesses the very highest restraining powers without any retarding effects whatever—that is, without rendering a longer exposure necessary. We have recently tried the formula given by Mr. Lea, and say with confidence that it seems the very perfection of a restrainer. Tried side by side with a developer restrained by acetic acid it gave, with at least a third less exposure, a much more satisfactory negative—one fuller of fine detail, perfectly soft, and yet sufficiently brilliant to yield prints of high quality.

Although the use of a soluble bromide in alkaline development is almost universal, we have some doubt as to its claim to be a restrainer in the proper acceptation of the term. It is well known that immersion, under certain circumstances, in a solution of such a bromide will destroy altogether the latent image, and we have a strong suspicion that its supposed action as a restrainer should more properly be attributed to its power to partially undo what the light has already done. At all events, we know that a collodio-bromide plate with a beer preservative may be developed with pyrogallic acid and ammonia without any restrainer, and with an exposure considerably shorter than with any other preservative we have tried, when a bromide was used in development.

On the whole, then, as the result of a somewhat protracted investigation, we believe that the general adoption of an organic restrainer, in both iron and alkaline development, would tend to secure a finer quality of work in a shorter time; and we commend the matter to the consideration of all interested in the subject of restrainers.

REVOLVING AND OTHER CAMERA "BACKS."

We imagine that only a limited number of admirers will be found for a dry-plate "slide" of peculiar construction which was exhibited by Mr. J. Werge at the last meeting of the Photographic Society of Great Britain. But, previous to indicating the direction in which we believe it can be improved, it is, first of all, necessary we should give a description of this slide or receptacle.

In a circle of wood about twelve inches in diameter there are, radiating round the centre, six square perforations of the size, and for the purpose of receiving a like number, of quarter-plates. As the ground-glass focussing-screen occupies one of these apertures the number of sensitive plates is five. The disc of wood thus charged with plates is so constructed as to revolve inside of the overlapping edge of another disc of similar diameter, but in which there is only one aperture. The latter disc is so fixed to the camera that the aperture is directly opposite to the lens, and situated in the posterior part of the camera at the focus of the lens. It follows, then, that by rotating the disc with the plates any of them may be brought opposite to the aperture in the stationary circle and thus be exposed. In taking a picture the revolving disc is moved until the ground glass is brought opposite to the lens, and, after the focus has been adjusted, the disc is further rotated until any desired plate is brought into correct position, when the exposure may be made.

Now, the weak point of this revolving slide is its great bulk. While its diameter is very considerable in its present arrangement for quarter-plates, for sizes larger than this the diameter would so increase as to make the use of the slide impracticable; and if the principle were applied to plates over twelve inches in dimensions a holder that would accommodate half-a-dozen such plates would require to be of a diameter equal to the top of a loo table.

We may here preface what is to follow by the observation that in point of convenience, compactness, and portability no means can surpass the existing double dark slides for the facility with which dry plates can be carried and manipulated in the field. This *dictum* of ours has reference merely to small numbers of plates; for when they approximate to, or exceed, a dozen the changing-box then offers the greater advantage.

The ordinary double dark slide is a beautiful, but an elaborate and expensive, piece of mechanism. The special feature of the circular dark slide shown by Mr. Werge is its power of storing several plates in the single slide. A good dark slide should have few or no portions unutilised; the circular slide, alas! has too many. Five quarter-plates only in a circle of a dozen inches certainly exceeds the bounds of moderation. Still there is an "idea" pertaining to the slide; let us present it.

In taking on a country tour, say, a dozen sensitive plates there is no actual necessity why the services of six double dark slides should be required. What we are about to recommend is a single slide, of the usual double character (no pun is here intended), in which six quarter plates shall be placed, side by side, six other plates forming the lading for the opposite side of the slide. The expense of such a slide will be little; its convenience very great. Each plate should be shaded from light by its own special slide, which may be made of thin zinc; and the total expense of the apparatus need not be more than a few shillings. From a long

practical acquaintance with a slide of an exceedingly simple and yet effective description — which any person interested in this department of the mechanics of photography may have an opportunity of examining by calling at the publishing office of this Journal—we are enabled to offer the following suggestions for the benefit both of the trade and the amateur who is skilled in mechanics:—

A mahogany frame must be provided of such length and height as will permit two, three, four, or more quarter-plates being laid down, side by side, on a projecting face of wood left for the purpose. A zinc slide must have been let into the frame for each plate in such a way that when the zinc slide is drawn up or down the sensitive plate becomes exposed. These plates are introduced from the back, but there is no door to close over them and exclude the light when once they are *in situ;* for when they have been inserted an opaque sheet of cardboard or very thin metal is placed over them, and an equal number of sensitive plates is laid down upon this sheet, *face uppermost*. Small metallic corner-pieces, or turn-buckles, are now brought into operation, by which the second series of sensitive plates are locked into their places, separated from the first series only by the thickness of the card, which, being of a springy nature, forces the plates rigidly against the resisting faces of the frame. In our own case we find that a permanent springy curve can be given to a piece of cardboard by forming it of two pieces, and cementing them together one of them being *wet* and the other dry at the time of their being cemented. When dried the compound card will have a curve so absolute as never again to become flattened. The faces of this second series of sensitive plates are quite protected from the light by a series of zinc shutters similar to those by which the opposite side is guarded.

In connection with the use of a camera slide of the kind described we must be permitted to add our strong recommendation that the shutters be pulled *downwards* when the exposure is about to be made. This obviates the necessity for having a hinged flap on the shutter, and prevents all access of light to the sensitive plate; for, if by reason of imperfect fitting there was a small admission of light, such a feeble ray, being reflected from the ground immediately below the camera, it would have no detrimental effect upon the plate compared with that admitted if such light came direct from the bright sky overhead.

Recently there appears to have arisen a prejudice against the use of pyrogallic acid which has been kept for any length of time in solution in alcohol, although a few years ago this was the almost general practice. The reason given for this new dislike is that the pyrogallol loses it developing power. Now this is to a certain extent true, while at the same time it is not a necessary consequence. Pyrogallic acid, as everyone knows, has a powerful affinity for oxygen, and will combine with that element so readily that if left for a short time exposed to the atmosphere, especially in the presence of moisture, it becomes converted by oxidation into a black mass resembling powdered charcoal. It is this oxidation which destroys its developing power, and which causes the discolouration of its aqueous solution in so short time, in consequence of its absorbing oxygen from the water. Now, dissolved in alcohol it does not produce the same result, its power being apparently insufficient to bring about decomposition of the alcohol. It is for this reason that the pyrogallol should be dissolved in *absolute* alcohol, as the ordinary strength, such as is generally employed in making collodion, contains sufficient water to rapidly discolour the pyro. The alcohol should moreover be pure, not methylated, though a good sample of the latter, if absolute, is much better than pure alcohol of a lower grade. The solution of pyro. in pure absolute alcohol, if kept well stoppered (for exposure to the atmosphere is as bad as the presence of water), will be scarcely perceptibly discoloured in twelve months. The great convenience of the plan of keeping the pyro. in solution—instead of weighing it out in small quantities every day—not only to amateurs, but in the ordinary studio work of the professional photographer, has induced us to call attention to a fact which appears to be overlooked at the present day, and which will probably account for many discrepancies in the opinions of different operators as to the value of dissolved pyrogallol.

TO FILTER OR NOT TO FILTER?

One of the popular superstitions connected with photography relates to filtering. About once a month—sometimes oftener—during the last fifteen or twenty years some liberal-minded person has written to the journals with an account of his method of compounding the silver bath. Sometimes iodide is added—sometimes forbidden. Sometimes the best crystals, sold at an extra price, are to be used; at other times the common nitrate of silver answers every purpose. Distilled water, tap water, pump water, rain water (raw and boiled) have their advocates; but in one thing our advisers are unanimous —"Filter the solution," say they all. Nor do they stop here: it is not unfrequently recommended to filter the negative bath at the end of each day's work, and a variety of ingenious contrivances have been devised to simplify the operation and save the fingers, the floor, the pantaloons, and the temper from deterioration.

Much the same sort of advice is given respecting the printing bath. All manner of things are to be added; it is to be diluted, strengthened, boiled, sunned, and—*filtered;* and a long and tiresome job, I have reason to know, it often is, particularly when the aforesaid contrivances are not in use. A big funnel is the usual apparatus, and, as anyone who has tried will sorrowfully confess, the whole thing is a nuisance. Sometimes the solution sticks and will not go through at all; at other times the weight makes a hole in the apex of the filter, and it goes through the wrong way, receiving comminatory remarks in its progress, and involving mess, waste, and trouble. Even the best filtering-paper probably imparts in time some impurity to the solution, whilst the common white blotting-paper is quite as likely to be used.

Now all this is a mistake. Simple decantation does not answer, as it will not get rid of the film that generally forms on the surface. My plan is to have a bottle or jar of a size suitable to the quantities usually requiring to be operated upon. At a short distance from the bottom a glass or stoneware tap is inserted. Such bottles are sold by all dealers in chemical apparatus—certainly up to four gallons capacity—and are in common use for a variety of purposes not exclusively chemical or photographic, so that there can be no difficulty in getting them. Their use is sufficiently obvious. The solution—thick with iodide, kaolin, or whatever else may be fancied—is simply poured in and allowed to settle, allowing plenty of time, and giving the bottle a slight shake once or twice to detach any light deposit that may have adhered to the sides. When perfectly clear, nearly the whole may be drawn off by the tap. The only care required is to receive the first few drops from the tap in a separate vessel (they can afterwards be returned to the jar), to see that the tap does not run too fast, thereby creating currents in the bottle and disturbing the deposit, and to stop it before the surface film descends too far. A similar bottle, or, rather, two smaller ones, may be used for collodion, the two allowing a longer time for depositing. The quantity required is drawn off into suitable pourers, and what remains at the end of the day's work returned to settle.

It may be objected that some of the solution is wasted, and, perhaps, for amateurs and merely experimental purposes there may be something in this. My remarks, however, are intended to apply to the routine of professional work, in which a small quantity of stock solution can always be afforded, so that there is no ultimate loss. I have now for many years discarded filters for the ordinary working baths, both negative and printing.

What has become of the glass wool mentioned as a filtering material a year or two ago? It seems to have dropped out of notice, or has it been found unsuitable? It can scarcely be the cost, which was, I think, four or five shillings per ounce; and as an ounce went a long way, and the material was washable in acids, the price cannot be considered prohibitive. Certainly, if I were as much addicted to filtering as some of my brethren, I should give it a trial if to be obtained. Russell Sedgfield.

A FEW WORDS ABOUT LIGHTING.

[A communication to the Glasgow Photographic Association.]

I am very happy to be able to respond to the request of your Secretary with regard to the negatives, transparencies, and prints which were sent to illustrate my paper read before the Edinburgh Photographic Society; but, as I think I cannot add anything to that paper, I have done the best I can in another direction, which I hope

will be interesting. The short time I have had to prepare anything for this meeting must be my apology for all shortcomings.

I may, perhaps, be permitted, by way of preface, to congratulate you upon what The British Journal of Photography calls your "awakening." When in Glasgow, in 1873, I was surprised to hear that a town of so much importance and with so many first-class photographers, should have no Society. It appears you had, only it was like the princess, sleeping. I do not know what is the name of the prince who has been potent enough to break the spell and make the Society open its eyes again; but I hope now that it is awake you will not permit it to be again overcome.

Knowing, as I do, from experience the class of work turned out in the galleries of Glasgow, I am afraid I can say very little upon the subject of lighting which is not known and practised by most of you; but I hope my remarks may be tolerated for the sake of those who are not so well up in the subject.

I am not going to dogmatise upon north lighting, south lighting, or any other lighting; but I wish to give you the conclusions I have arrived at from a large experience and observation in galleries in the three kingdoms.

The time has long passed when the sole idea of the photographer was to get as much light as possible from any direction. I can remember a circumstance which happened to a friend some fifteen years ago which has occurred to more than one. This artist had a long, low, skylight in his studio—the only light he could get, as there were chimney-pots all round. He made very good pictures in this studio, and succeeded so well that he was enabled to buy the house and make a grand place. He pulled down his old place and built a new one a story higher, clear of the chimneys, and put glass almost all round. You may guess his surprise and dismay when he found he could not get such good pictures in his grand new place as he could under the old skylight. He was taught a practical lesson which many photographers have yet to learn, namely, that it is the quality, not the quantity, of light which is required.

My experience is that diffused light of any kind is to be avoided, and if I had to build a new studio tomorrow under the most favourable conditions I would have no light on the south side. A long, steep ridge, which is both top and side light in one, is the one I should choose. But the form of light is not so important as the knowledge of what is wanted in a picture; that knowledge enables the photographer to get the effects desired in almost any kind of studio. My journey into Scotland proved this to me practically, for I saw well-lighted pictures, full of modelling, turned out in studios such as I had never seen in England. In Largs Mr. Fergus had just erected a studio which was all top lighted. If I remember rightly there was no glass at the sides at all, and the sides were, at least, seven or eight feet high. Mr. Fergus, of Greenock, and Mr. McKenzie, of Paisley, both worked in the same manner—with a high top light without side light. This is only an illustration of the fact that knowing what to do and how to do it brings success, not the tools we work with; for the light is the photographer's tool, to be used with judgment and discretion.

Now I will try if we can arrive at a knowledge of what to do, and how to do it will follow. We have as photographers to make a portrait, and as artists to make a picture if possible. To begin at the beginning: you must place your sitter in front of your background; if you place him (or her) in the open air, the shadows are all thrown downward from the predominance of top light, the face is flat because the light is from both sides, and if a photograph were taken in such a light the result would be weak, flat, and poor, with black shadows under the eyebrows, nose, and chin. Now screen off the direct top light. The face is still flat, but the many downward shadows have disappeared. Now screen off one side as well as the top light, and the face is not like the same. With the light all round the face it would appear broad, flat, and altogether deficient in character. Now it is just the reverse; there is too much light on one side and too much shadow on the other—every prominence upon the face is exaggerated, and the texture of the skin shows with a coarseness which is far from natural. As Artemus Ward says, "why is this thus?" Because there is too much direct side light. Screen off the side light until you get a delicate shadow upon the edge of the lighted side of the face. This will send the ear and the retiring edge of the cheek into their proper places, and concentrate the highest lights where they should be—upon the forehead, over the eye, upon the nose and chin; but still the shaded side of the face is too dark for photographing. And here comes the difference in practice. Some would use a screen to soften the shadow and give reflected lights. This is right enough if you use large screens and keep them far enough away from the sitter to give the reflected lights as they would be if reflected from the side of a room. In my own practice I prefer to use a little of my far-off top light to soften the shaded side, but then my studio is very small, and I get my reflections from the wall of the studio; in a wider place reflecting screens would be necessary.

There is nothing, I think, so useful a sa three-leaved screen hinged and upon castors, white on one side and grey upon the other, and so hinged that one leaf of each colour can be brought into the other if wanted. The facility with which the leaves can be placed at any angle for reflection is of great value. Small hand-screens are, in my opinion, a mistake. They concentrate reflected lights upon the face only, and sometimes only on parts of the face. *The screen should be large enough to give the same reflected lights upon both face and drapery.*

So far, then, in making a portrait. What comes next to make it a picture? A photograph may be a likeness, and yet not be either a picture or a faithful portrait. To make a picture it should have expression, repose, concentration, and keeping.

The expression, to a great extent, depends upon the sitter; but the artist can put that sitter at his ease by his manner and conversation, and so get him at his best. Another thing tending to destroy an easy and natural expression is too great an amount of light. With some persons even an ordinary light will cause a frowning contraction of the brow, which gives to the best-tempered face an ugly scowl. Temper the light to your sitter until he can open his eyes naturally, and he will not only feel easier but will look so, and pleasing conversation and easy manners will do the rest.

Concentration, keeping, and breadth are the three essential qualities which will make a portrait a picture. The centre of interest is, of course, the head, and upon that the attention should be concentrated. This must be done by keeping all other parts of the picture in subjection to it. This is easiest done upon head and shoulder pictures, for there is nothing to sacrifice to the head. Sir Joshua Reynolds said—"The more you put in a picture the more the sacrifice." Wherever a light cuts against a shadow there will be concentration; therefore do not let your coat cut against a light background. I like a dark background, but not a flat one. By the use of curtains and a three-leafed screen I shut off the light from the top and side of my background nearest the light. By these means I get a gradation of shadow upon the lightest side of the sitter, so that the lighted side of the head is relieved against the shadow side of the background. I get balance upon the other side by the use of a dark curtain or piece of furniture. It could be obtained by graduating the colour of the background upon that side. A low side light will destroy keeping by lighting up the lower part of the figure to the same extent as the head, and so bringing into equal prominence the head, hands, and feet. My studio is so situated that a garden wall cuts off all light five feet from the ground, and I am all the better for it; for if I build another place I should not have glass lower than five feet from the floor. This keeps the lower parts in subjection. Be careful in placing accessories that you put nothing which will either by its colour or reflected lights cut up the picture *Concentration is obtained by keeping all your lights together.*

Breadth is obtained by secondary lights lower in tone than the principal light being carried into the shadow. These lights should get lower in tone the farther they are removed from the principal light. There is concentration in a white spot upon a black board, but no breadth. *A judicious gradation of lights into shadows and shadows into lights will give breadth to a picture.*

I must now conclude or the post will leave without my paper, and in that case I shall be a day behind the fair. I could have wished for more time to have done greater justice to my subject, but I know you will take the will for the deed. George Croughton.

A PROPOSED METHOD OF AUTOMATIC PRINTING.

The labour of the philosopher often remains unrecognised, or, even worse, thought useless, until some one with, probably, an infinitesimal portion of the ability displayed by the original investigator makes some practical application of his work, and thus secures the fame and pelf denied by a community to those who are its greatest benefactors—a community that deifies its kings, makes heroes of its soldiers, patronises its labourers, and starves its *savants*.

In the latter part of 1873 Mr. William Crookes brought before the notice of the scientific world an instrument enabling him to transmute light into mechanical force. I am unaware of any practical application of this instrument beyond that of timing its revolutions, and from such *data* ascertaining the desired information. At the present time I am endeavouring to apply this instrument not only to time the exposure, say, of a carbon print, but, should it be desired, ring an alarm bell, and shut off or withdraw the frames from exposure. Personally I have no desire for secrecy. The apparatus, as most of

your readers will guess, is based upon electric contact being made and broken with each revolution of the instrument.

I understand there is some difficulty in maintaining, in a glass vessel through which platinum wires are passed, such a vacuum as is obtained by the Sprengel air-pump. Should such prove a fact a method is devised by which the apparatus in which the instrument is placed could be situated along with free electric communication in a torricellian vacuum. Should Mr. Crookes's radiometer prove inapplicable in general practice a *dernier ressort* will possibly be found in an actinometer lately devised, and based upon the behaviour of selenium in the light. Upon the completion of my labours, or, more truthfully, in due time, your readers (with your permission) shall have more information than can be gathered from this rude outline.

It need scarcely be pointed out that such an apparatus would, if sensitive enough, just as readily time the exposure of a plate and close the lens as withdraw a printing-frame. To some vivid imagination the vision of an operator will be conjured up showing him lazily reclining while a machine does the work; but such dreams will never become accomplished facts. While the purely mechanical efforts of man can be superseded by mechanical aids the day is as far distant as ever when thought will be done by machinery.

W. E. Batho.

NOTES FROM THE NORTH.

In the description of Mr. Tunny's new studio, in my last batch of *Notes*, I expressed a doubt as to the wisdom of glazing the operating-room entirely with ground glass. The doubt, I knew, was shared by many experienced operators, and therefore the experiment was watched with considerable interest. I have again visited Mr. Tunny, and am glad to say that he is thoroughly satisfied with the result. Contrary to his expectation, however, he has not been able to work without blinds. Even the white ones were unsatisfactory, and have been replaced by others of a dark blue, both on the top and side light. He is quite enthusiastic in his praise of the arrangement; and, if I may judge from the quality of the work being done in the new studio, he has good reason to be enthusiastic.

Some time ago I called attention to the important part photography was playing in the getting-up of a book about "Free Church Worthies," and I have now much pleasure in noticing another of its triumphs in a very handsome volume just issued by Mr. Elliot. It consists of a series of portraits by Sir Henry Raeburn, admirably photographed by Mr. Annan, and accompanied by letterpress by Dr. John Brown, Dr. Donaldson, the widow of Professor Ferrier, &c., &c. The portraits include two of Sir Walter Scott; Tait, of Harvieston; Dr. Adam, Rector of the High School; Macdonell, of Glengarry; Dr. N. Spence, "Singing" Jamie Balfour, Niel Gow, Rev. Sir Henry Moncrieff, Dr. Andrew Thompson, Rev. John Home, Sir John Hope, Sir D. Baird, Francis Horner, Robert Syme, &c. Altogether the work is got up in a style which leaves nothing to be desired. It does seem strange, however, that in this age of carbon printing, when prints in permanent pigments of such great beauty are being produced all over the country, the illustrations of such a valuable work should be printed in silver. So much was I staggered with this, that I confess to having doubted the evidence of my own judgment, and it was not till I had asked one of the *employés* of the publisher that I could really believe they were silver prints. He at once settled this matter by assuring me that they were really silver, and, by way of explanation, said that part of the edition was in autotype, but that, as the prints were so unsatisfactory, silver prints were preferred. This is certainly somewhat difficult to believe. There must be a screw loose somewhere, and somebody should look into the matter.

Speaking of carbon printing naturally leads to another note on the subject. Are lichtdruck prints permanent? Nearly everybody will at once reply, "Certainly;" but, from what I saw a few days ago, I know that the opinion needs some qualification. No doubt the lithographic or greasy ink of which the lichtdruck picture is formed is beyond suspicion; but as much cannot be said of the surface on which the image is sometimes, if not generally, printed. With a view either to get finer detail, or to give the print the appearance of one on albumenised paper, the lichtdruck is too often printed on a glazed or enamelled surface, and if that glazing should have been given by a body soluble in water the print will be liable to serious injury unless very carefully managed. In the case alluded to a much-valued print was lying on a table, and a few drops of water had accidentally been spilled upon it. The accident was not noticed for a few minutes, and then an attempt was made to wipe it off. Under the impression that it was as firmly fixed as an ordinary engraving probably a little more force was used than was really necessary; but the result was the slipping away of a portion of the picture as easily as if it had been one of the Swiss transfers. Let lichtdruck printers take the hint and see that the enamelled paper is insoluble in water, or, if that cannot be obtained, they should use ordinary plate paper for their work.

As the continental photographic journals are once more allowing so-called "spirit photography" to come to the surface, let me tell my readers a little story of how such phenomena are occasionally brought about. It happened in Edinburgh some time ago; but, as the photographer upon whom the trick was attempted to be palmed off is a confirmed believer, he refused to give permission to publish it, on the ground that the "cause" would thereby be injured. He has now been brought to see that truth is most surely established by the weeding-out of whatever error may have gathered around it, and gives me full permission to relate the story as he gave it to me. It is better, in the meantime at least, not to mention names or give precise dates.

Well, once upon a time, a certain celebrated doctor—celebrated, that is, in spiritualistic circles—came to Edinburgh, and made it known that for a consideration, and a pretty good one too, he was prepared to open the eyes of the general public to the wonders of spiritualism. My photographic friend, firmly persuaded that spirit photography was a fact, "interviewed" the doctor, and the result was an arrangement by which he took his apparatus and *matériel* to the doctor's temporary residence. Here he found a meek-looking clergyman, more than half convinced of the truths which the doctor professed to teach, and ready to confirm the genuineness of the photographs about to be taken. A dark room was soon extemporised, the sofa wheeled into a good light, and the operation commenced. The medium was to sit on the sofa, and an essential condition made by the spirits themselves was that both photographer and clergyman should leave the room during the exposure. The difficulty of uncapping the lens was overcome by the medium proposing to tie a string to the cap, so that he might pull it off when he felt the influence around him. Under these conditions a plate was exposed and developed, and on it were impressed two images—one sitting upright, well exposed, but somewhat wanting in sharpness; the other lying, or rather leaning, on the end of the couch, somewhat hazy and indistinct, but unmistakably like the doctor himself. This he at once recognised as his brother, long since dead, and who, he explained, always dressed in the spirit world—out of compliment to the doctor I presume—like himself. My unsuspecting friend believed the story, and made another trial. This time, before development, the medium told him that he should find a spirit clothed in white just over his left shoulder, as he had felt it resting there during the exposure; and, sure enough, so it turned out, only it was somewhat difficult to make out anything but a hazy white mass of light. After a little persevering examination, under the doctor's tuition, he at last thought he perceived something like the features of a pale-faced form, and as the light had by this time departed it was resolved to try again next day. Before retiring, however, the doctor asked him, as he was quite satisfied that a spirit photograph had been got, to write a short letter for publication in one of the spiritualistic journals; and, so easily are those who have faith led to do what their teachers request, he actually, on the evidence (?) which I have recorded, signed a letter to that effect dictated by the medium.

Next day the experiments were about to be repeated, and just before the exposure of the first plate the Doctor, thinking that the photographer's faith was strong enough to induce him to do exactly as he was desired, proposed that he should remain in the room, but that he should turn his face to the wall—the spirits, I suppose, being too shy to be seen by a second mortal. To this, of course, the photographer gladly agreed, and my friend, after removing the cap, walked towards the mantlepiece, intending to conform strictly to the conditions imposed. But "the best-laid schemes o' mice an' men gang aft a-gley." Unfortunately for the Doctor there stood on the mantelpiece a clock covered by a glass shade, in which was clearly reflected the sofa and the medium seated on it. The first idea of my friend was to shut his eyes, as he was honestly anxious to do what was right; but his curiosity proved too strong for him, and he did not, or this story would not have been told. His curiosity was fully rewarded. The spirits certainly appeared, but in a form altogether different from what he expected. What he saw was this:—The Doctor rapidly drew from his breast a white handkerchief, and holding it over one of his shoulders, kept it in gentle motion for a few seconds, and then replaced it and cried "time!" The plate was developed, and lo! the hazy image appeared, and, as before, was recognised by the medium as one of his guides. The

photographer, however, had seen sufficient to prevent his being misled a second time, and, pushing his hand under the medium's waistcoat, withdrew the handkerchief, with the quiet remark—"I'm afraid this is the spirit, Doctor!" What the Doctor said, and what the photographer replied, I cannot tell. I had got sufficient for my story, and did not care to hear more—a state of mind in which my readers are by this time quite at one with me, I have no doubt.

John Nicol, Ph.D.

NOTE ON PHOTOGRAPHING THE LEAST-REFRANGIBLE RAYS OF THE SOLAR SPECTRUM.

[A communication to the Photographic Society of Great Britain.]

Anxious to repeat the experiments of Dr. Vogel and Captain Waterhouse, I have, during the last six months, when opportunities occurred, endeavoured carefully to follow the directions of the former gentleman. The addition of dyes to the collodion added to the length of the spectrum capable of being photographed; but the time taken to impress the necessary image was with me so great, comparatively, that I endeavoured to ascertain if some quicker means of impressing the red end of the spectrum might not be obtained. Without doubt the red and other dyes mentioned effected all that was believed of them; but it struck me as being essential to find out really what part they played in rendering the film sensitive.

After a long and tedious examination I found that nearly every gum-resin added to the collodion gave a certain prolongation of the spectrum—some more and some less—whilst other organic compounds gave prolongations which seemed promising; the more colourless the resulting salt of silver was the more extended became the spectrum. Omitting the bromide from the collodion entirely, and carrying out these examination, one gum was at last hit upon which was capable of giving a definite spectrum below A to some considerable distance; and adding this to the bromised collodion still better results were obtained with certainly much shorter exposures than were necessary when any dye was employed.

I do not now propose to carry my hearers through the tangled maze of the various agents employed, as I hope soon to publish a longer and fuller account of all the difficulties I met with in fixing on that body which seems to give me, for the present, the fairest chance of success. That which I selected I have worked with for some little time. It is a simple form of resin, obtainable in commerce, added to an organified collodion containing bromides and, in some cases, bromo-iodides. The sensitive salt is nearly pure white; and I find that the nearer it approaches to white the more sensitive to all rays does it become. The addition of a coloured dye to it diminishes the sensitiveness in almost exact proportion to the depth of the colour, which agrees with Dr. Vogel's statements on the subject. My belief at present is that the aniline dyes employed by this learned gentleman and Captain Waterhouse combine with the silver and silver bromide left in the films to form compounds of a resinous nature, and that these organic silver salts are sensitive to the red or other rays, as the case may be. To me it seems natural that they should be most sensitive to those rays which they can transmit, though not so sensitive to the whole of the spectrum as they would be if the compound chanced to be white and allowed all rays to pass.

I show two photographs of the spectrum commencing near F, and extending towards the ultra-red rays. In one case the exposure given was ten times that necessary to impress the sensitive compound by the blue rays; in the other about twelve and a-half times. In the first case the spectrum can be traced as far as B; whilst in the last it is seen down to A and a little below it. These two photographs were taken yesterday, when the sky was often covered with clouds and the atmosphere was generally unfavourable; but I have selected them as being nearly in focus and being taken with the slit of the spectroscope very nearly closed. (The matter of focussing is much more difficult than any one who has not tried to effect it is aware of.)

In earlier photographs (taken a month back) the length of the spectrum impressed was much more considerable than in either of these. In one case a distance equal to D-A was obtained with fairly defined lines, *not* reversed as in the spectrum published by Captain Waterhouse. I believe that with a good condenser, properly arranged, and a bright sun, with ten minutes' exposure, all this ultra part of the red may be photographed. The great difficulty to encounter is the focussing, which can only be accomplished by trial and error, or by very elaborate calculations which I have not had time at present to undertake.

With uranium and iron salts successful spectra have also been obtained. In the latter case the difficulty of a suitable developer was much felt, though at length it seems that such an one has been found which will answer; with a bichromate compound, too, a fair measure of success has been arrived at, by following the method I previously published of giving a slight preliminary exposure. The photographs by these methods I have designedly refrained from showing, as at present they are in a crude state, badly focussed, and merely experimental; and the weather has been such as has prevented me from obtaining better.

This, then, is the summing-up of my results with these compounds:—

1. The sensitiveness of the film depends upon the addition of carbon compounds to the silver salt.

2. That the effect of the addition of dyes to the film is to cause sensitiveness in the film, owing probably to their chemical composition rather than to their colour.

3. That it is probable that the metals of lowest atomic weight (which can be shown to be at all sensitive to the action of light) are those which can be (proportionally) affected the most readily by the least refrangible rays. W. de W. Abney, *Capt.* R.E.

OPERATING DEPARTMENT.

No. I.

To take a negative, well posed, properly lighted, and properly developed, is an art which cannot be acquired in a week or month's time. It requires constant practice, careful study, and an educated eye to teach you when you are at fault, before perfection can be attained. Perseverance and a taste for the occupation must exist, for without these two success will never be secured in photography.

In the following remarks I intend to make I will treat of the different subjects in rotation—the construction of the dark room and glass house, lighting, posing, exposure, and developing; and let it be borne in mind that, unless the student pay strict attention to each consecutive subject, there is no use in his beginning at all. Without having mastered the one the others become valueless; for of what use is a well-exposed negative if it be spoiled in the developing?

The first point, then, to which I would draw attention is the construction of the dark room. It should be of sufficient size to accommodate with ease the operator and his assistant, be situated in the immediate vicinity of the camera, and be fitted with a sink and gas. In front of the place where it is intended to develope the plates there should be a large window of clear glass, with a frame fitted on the inside, covered with yellow cloth or paper, and made to slide up and down, on the same principle as an ordinary window, so as to let in a plentiful supply of white light at will. The door ought to be made on the swing principle, to fall to of its own accord. It is a great mistake to crowd the dark room with more bottles and chemicals than are required for use; therefore only those that are actually required should be kept in it, such as those containing iron, acid, methylated spirits, collodion, silver, bromide of potassium, &c. A couple of shelves—one for the negatives taken and the other for the materials—is all that is required, with the exception of a bench for the silver bath, and another opposite the yellow window to hold the developing dish.

Large glass houses, as a rule, are not advantageous, their only benefit being that they enable the photographer to take large groups; but a small, well-lighted studio is infinitely superior. Make it with plenty of north light, with a dead wall to the south, and all worked with blinds. These should be made of calico, black or white, with rings sewn on the long way of the blind on each side; then stretch two pieces of wire, slip them through the rings, and fasten up on the spot you wish it. Thus, by means of a stick pushing the blind up or down the wires as you choose, the light may be adjusted at your pleasure.

The glass house should never be without a stove; for as it is generally on the roof of a house the air, as one ascends higher, becomes more rarefied, and, besides, the chemicals in the winter months do not work properly unless the atmosphere be at a warm temperature. As to ventilation, which is a most important subject, I would advise that one of the sashes of the windows be made to open and shut; and, with regard to the dark room, a skylight ought to be fitted to admit an occasional current of fresh air. Lindsay Howie.

FOREIGN NOTES AND NEWS.

Preserving Plates Moist During Exposure.—Long-Keeping Dry Plates.—Dr. Van Monckhoven and the Carbon Process: Another Improvement.—Brown Tones in Glass Positives.—Count de Courten on the Reproduction of Engravings.—

At a recent meeting of the Brussels section of the Belgian Photographic Association M. de Damseaux said, in continuation of some remarks upon the same subject by M. de Blochouse at a previous sitting, that, in order to preserve plates moist during a long exposure in the camera, he had used with success glycerine added to the collodion in the proportion of from eight to ten per cent., though the exposure was slightly increased by this means. M. de Blochouse remarked that the late Mr. Sutton had recommended a preservative containing glycerine with the same object, but that gentleman had employed the alkaline development. He (M. Blochouse) had obtained with that process negatives which it would have been quite impossible to produce by the wet process, but the deposit was slightly granular. He had found the process very convenient and more rapid than ordinary wet plates. M. de Blochouse subsequently announced that at a future meeting he would give a *résumé* of what the late Mr. Sutton had written upon this subject in the French and other journals.

MM. de Damseaux and Delaunoy stated that they had been successful in developing a number of dry plates, prepared with tannin and dextrine as the preservative, more than twelve months after exposure.

The members of the Ghent section recently assembled at the laboratory of Dr. van Monckhoven to witness a demonstration by that gentleman of the working of the carbon process. After a minute explanation of the various details of the process M. Monckhoven announced that he had made an important improvement in the latter part of the operations. This consists in the application to the washed and "alumnised" prints of a solution the composition of which will shortly be divulged, and which possesses the property of destroying the relief caused by the moist gelatine, which frequently, upon the application of the final support, tends to injure the finer details of the proof. The temporary support employed by M. Monckhoven consists of a plate of glass coated first with a solution of five parts of white wax in 1,000 parts of benzine, and afterwards with collodion slightly coloured with indigo and containing a small quantity of castor oil. After washing this prepared glass until all traces of ether and alcohol have disappeared, the exposed tissue is transferred in the usual way by means of the squeegee.

In answer to a question as to the best means of obtaining brown tones in glass positives M. Renoz, a member of the Liege section, believed that such tones were obtained by a special process, while another member mentioned nitrate of uranium as one of the salts which gave the result desired. M. Renoz promised to experiment in that direction.

In the last number of the *Moniteur* Count Ludovico de Courten has an article upon the subject of the reproduction of engravings, in which he treats of the difficulties encountered and the means of overcoming them. One very common fault he mentions is the want of clearness and delicacy in the finer lines, which latter, instead of being represented as clean-cut lines as in the original, are rendered in a sort of spurious half-tone. The author remarks that some may consider this rather a gain—that it secures greater softness and harmony; but he himself is of a different opinion. Holding the opinion that a picture, to be considered as such, should possess harmony he thinks that the presence of half-tone in a line engraving destroys that harmony and spoils the picture. The cause of this defect he attributes to the use of an unsuitable objective or to injudicious forcing of the development. With respect to the lens the author remarks that it is noticeable that the smaller the diaphragm the more marked is the defect, and goes on to explain the reason by pointing out that a ray of light passing through a narrow slit or opening of small diameter, in place of throwing an equally-illuminated spot upon a screen placed behind it, gives rise to a series of luminous bands of decreasing intensity with dark spaces between, and that a fine thread stretched in front of such an opening does not, as might be expected, cast a shadow. Arguing from this M. de Courten thinks it is easy to imagine that each line as it falls upon the sensitive film is bordered by an iridescent or luminous band, which is the cause of the mischief. The only remedy offered is to use larger diaphragms and not to strain a lens in trying to make it cover surfaces disproportionate to its focal length. It is stated that this defect is much more prevalent when diffused light is employed. As regards forced development, the author complains that the too general fault lies in the attempt to secure at the first operation the requisite density in the white lines of the engraving. This results in the simultaneous formation of a sort of half-tone arising from the "filling-up" of the stippling and delicate hatching of the high lights. It is not wise to attempt to gain intensity during the development, but to be content with securing the details only. The mode recommended is to employ a collodion giving a thin film, to develope with iron and acetic acid, and, when the details are fully out, to wash, fix, and intensify by means of bichloride of mercury. The subject will be continued in the next number of the *Moniteur*.

THE REACTION OF RED PRUSSIATE OF POTASH UPON METALLIC SILVER AND THE CONVERSION OF SILVER NEGATIVES.

[A communication to the Photographic Society of Vienna.]

For some time back Captain V. Tóth and I have been engaged upon a series of experiments with that method of intensification in which red prussiate, or ferricyanide, of potassium is employed, and the results of these experiments were laid before this Society at its last meeting.

The theory of the process by which metallic silver acts upon a mixture of potassic ferricyanide, with a solution of metallic salts—as in the uranic or plumbic methods of intensification—is not fully understood, and yet the knowledge of it is not without its practical value. I have studied this reaction, and found that it proceeds quite smoothly according to the subjoined plan, without, as Grüne assumes, the physical properties of finely-separated particles of metal playing any part in it:—I let a rather concentrated solution of pure ferricyanide of potassium act for several hours upon well-washed silver while yet damp and freshly reduced from nitrate of silver by ferrous sulphate; the silver turned a brownish-white. The solution, therefore, contained yellow prussiate in addition to red, and was free from silver. The insoluble residuum contained no potassium, and showed in a vacuum, when dried over sulphuric acid, the following composition:—

Atomic weight.	Computed percentage composition.	Ascertained composition
4 Ag = 432	67·09	69·73
Fe = 56	8·69	7·96
6 Cy = 156	24·22	
644	100·00	

Thus the composition approaches pretty nearly to that of ferrocyanide of silver; yet it seemed as if one part of the silver had been set free in the transformation, hence giving rise to the excess of silver found.

In order to convince myself that the reaction really took place as it appeared to do, and as the analysis of the silver compound would lead one to suppose that it did—

$$\underset{\text{Ferricyanide of potassium.}}{2\,K_6\,Fe_2\,Cy_{12}} + \underset{\text{Silver.}}{4\,Ag} = \underset{\text{Ferrocyanide of potassium.}}{3\,K_4\,Fe\,Cy_6} + \underset{\text{Ferrocyanide of silver.}}{Ag_4\,Fe\,Cy_6},$$

I again allowed ferricyanide of potassium to act as before upon freshly-deposited silver, and ascertained how much ferrocyanide was in the solution as ferrocyanide of potassium, and how much combined with the silver. The following result was obtained by analysis:—

1. The solution, on being treated with potassic permanganate, gave 0·439 grammes of ferrocyanide of potassium. 2. By being treated with weak muriatic acid the ferrocyanic nitrate in the insoluble silver compound was dissolved, whereby chloride of silver was formed, and, on the addition of potassic permanganate, the ferrocyanic nitrate yielded 0·146 grammes of ferrocyanide of potassium.

From these figures it is clear that the re-solution proceeds as above; that is, that from two atoms of ferricyanide of potassium under the action of metallic silver three atoms of ferrocyanide of potassium and one atom of ferrocyanide of silver are formed, so that there must be three times as much ferrocyanide in the solution as in the deposit, which, according to my experiments, already cited, is actually the case. If the reaction be sustained by heating the liquid a complicated re-solution sets in—both deposit and liquid assume a greenish-blue hue, a smell of prussic acid is perceptible, and a considerable portion of the silver is absorbed in the solution. (The foregoing analysis was made in the laboratory of the technical high school, presided over by Professor Weselsky.)

The occurrence of this re-solution is also of interest in the practice of photography, since, if the process were different, a modification of the method of intensifying with ferricyanide of potassium would be permissible, if there were potassium in the silver deposit, which, from the analogous formula—

$$K_6\,Fe_2\,Cy_{12} + Ag_2 = 2\,Ag\,K_3\,Fe\,Cy_6—$$

one would think there could not fail to be, a separate employment of ferricyanide of potassium and a salt of lead or uranium would be permissible in intensifying with lead or uranium, because the potassium of the silver deposit could be easily displaced by lead or uranium.

Starting from this hypothesis, Captain Tóth and I set this inquiry on foot; yet, before I had finished my examination of the chemical process

by which ferricyanide of potassium acts upon silver, what can now be concluded *à priori* became evident—no intensification with lead can be attained by pouring red ferricyanide of potassium over a negative, washing it, and subsequently treating it with a solution of sulphate of lead. If a mixture of a salt of lead (or uranium) with red ferricyanide of potassium be allowed to act upon a silver negative there arises, in consequence of a secondary action of the yellow ferrocyanide of potassium, a precipitate of plumbic ferrocyanide:—

I.—$2\,K_6\,Fe_2Cy_{12} + 4\,Ag = 3\,K_4\,Fe\,Cy_6 + Ag_4\,Fe\,Cy_6$.

II.—$3\,K_4\,Fe\,Cy_6 + 6\,Pb\,(NO_3)_2 = 3\,Pb_2\,Fe\,Cy_6 + 12\,K\,NO_3$.

A mixture of ferricyanide of potassium and peroxide of iron behaves similarly: but if it be wished to secure the reaction an undisturbed course (ferric sulphate) sulphate of peroxide of iron must be used, and then the process goes on as already described. The ferrocyanide of potassium, evolved by the action of the silver of the negative upon the ferricyanide of potassium, with the ferric sulphate (sulphate of peroxide of iron) with which it is commingled, gives a beautiful blue precipitate of Prussian blue, in consequence of which the negative becomes very distinctly blue.

The behaviour is quite different when the negative is coated with a mixture of the solutions of chloride of iron and ferricyanide of potassium. The negative, indeed, becomes blue, though more slightly than in the former case; but the turning blue is not the consequence of the formation of ferrocyanide of potassium, as the latter is not now formed, because the mutual exchange of chloride of iron and silver is much more easily accomplished than that of ferricyanide of potassium with the latter, and the formation of subchloride of iron (in the presence of chloride of silver) thus effected is in association with the ferricyanide of potassium—the origin of the formation of Turnbull's blue.

According to the experiments made by Captain V. Tóth and myself, Grüne's statement that silver negatives are not turned blue by this solution is erroneous. According to Grüne it is only platinised negatives that become blue, not common ones; this is evidently incorrect. Certainly a platinised picture also speedily becomes blue in a mixture of perchloride and red prussiate; we also know that this takes place after the most complete change of all the silver for platinum. If a negative were treated with chloride of platinum, and then the silver thrown off fixed out, then replaced in the platinum bath, and so on, this operation being repeated three times in order to remove all the silver, the pure platinum plate would become blue quite as soon.

Since the lead and uranium methods of intensification proceed according to certain chemical laws, it is clear that they cannot be continued to an indefinite degree of density; still the silver has the power of precipitating a great quantity of uranic or plumbic ferrocyanide. Two atoms of silver require three atoms of lead or uranium (as a ferrocyanide), or, what is the same thing, two equivalents of silver precipitate six equivalents of lead or uranium.

It will appear that from the theoretical point of view the method of intensification with prussiate is the most rational, when we consider that four atoms of silver are required for one atom of platinum (from chloride of platinum); and that three atoms of silver only require one atom of gold; and that one atom of silver is required to form one molecule of insoluble subchloride of mercury from chloride of mercury.

JOSEF MARIA EDER, M.D.

NOTES FOR A SHORT TOUR IN BELGIUM WITH THE CAMERA.*

PASSING along the streets of Ghent we meet more monks and nuns than we have seen before on our journey, the former having long, brown robes and cowls, and the latter (who are of the order of begging nuns—Beguins) dressed much in the style of our Sisters of Mercy. The Beguins are a numerous body, the old Beguinage, having about 700 sisters, forming a small town of itself, and having a handsome church for the use of the sisterhood. In their magazine is a beautiful painting of the *Head of Our Saviour*, said to be by Raphael. Another class of females which attract attention are the peasants, who come in from the country with their little milk carts drawn by handsome mastiffs, the milk vessels being brightly polished brass of elegant form, while the dames are clad in long, black cloaks, with high-crowned, narrow-rimmed straw hats, under which they wear snow-white caps, and broad lappels hanging down their shoulders covered with the richest embroidery, forming a very picturesque costume, each seeming to vie with her neighbour who shall have the gayest and handsomest ribbons. This proving enough for one day we agree to examine the other churches and places of interest before we commence operations, as we are satisfied that we cannot devote less than eight days to accomplish all we desire here.

Meanwhile, for a change we make a run to Oudenarde—a ride of about three-quarters of an hour. The principal object of attraction is the Town Hall—a much smaller building than that of Ghent, and less elaborately finished, but very complete in itself and forming an excellent subject for the camera from all sides, as it fronts the Grand Place on the one side and a wide street on the other. The interior of this, which remains in its original state, gives a very good idea of what these buildings generally were, with their massive oak ceilings and quaint projecting and highly-ornamented chimney-pieces rising to the ceiling of the rooms. The old porch at the entrance to the council room is elegantly designed and finely carved, and is so much prized that it was taken down and sent over to the great Exhibition of 1851, as a specimen of carving.

* Continued from page 129.

Immediately facing the Hotel de Ville there are some old houses elaborately finished in the Flemish style, and which are worthy of being photographed. The exteriors of the two churches do not present much worthy of notice, but the interior of St. Paumele will well repay a visit. Three years ago it was discovered that the large pillars between the arches, which at that time were square, had originally been round, and on the plaster and brickwork in which they were encased being removed the old pillars were found to be decorated in colour, and further investigation showed fine early gothic foliated capitals, with boldly-sunk arch mouldings, all richly coloured to correspond with the pillars, all in excellent harmony and taste. A complete transformation had been effected at some distant period, and the gothic features were all plastered over and finished with very poor Italian details, I happened to be there at the time the pillars were laid bare, and speaking of it to M. Caneel, the Director of the Government School of Design in Ghent, he told me that government had ordered the whole to be restored to its original state. When this is done it will be one of the most unique churches in either Belgium or Germany.

Another day we devote to Malines, and as it is a large town we must start with an early train, the journey occupying about one hour and a-half. The station is on the outside of the town, and proceeding thither we meet with a curious, old, turreted and arched gateway that must be photographed. A little farther on we come to the Grand Pont, the general view from which, with the quays on each side of the Dyle, makes a good picture, while a number of the houses on the quay form a succession. A little beyond this is the Grand Place, on one side of which is the grand old cathedral, with its massive unfinished tower, 350 feet in height, at present all undergoing repair, and a number of fine old houses all round the place.

The cathedral possesses some valuable pictures, and both interior and exterior afford good subjects for the camera, all of which can be managed in a day and return to Ghent in the evening. Before leaving Ghent we visited the picture gallery (which is hardly worthy of the place), and in the evening the Academy des Beaux Arts, under the skilled and able direction of M. Caneel and an efficient staff of assistants, and were much delighted with the thorough system of teaching and the great number of able pupils—there being over 800 out of a population about one-half the number of Edinburgh.

Bidding goodbye to Ghent we take our tickets by the Pays Ways railway to Antwerp. An hour brings us to the river's side, and in five minutes we are across the Scheldt and in Antwerp. An omnibus being waiting we go on, and in ten minutes more are set down in the Place Vert, at the door of the Hotel de l'Europe, where we shall find in M. Barber a kind landlord and a houseful of English people, all either going or returning on their continental tour. Here, also, are to be had all the English newspapers of the day, with an occasional stray copy of the *Scotsman*.

From the window of our bedroom there is an excellent view of the spire of the cathedral, 492 feet in height, towering above everything around it. This is said to be the model on which the gifted Thomas Kemp formed his idea of the Scott monument; and he could have found nothing finer. It will take two days to examine all that is to be seen here, even in the most cursory manner; but the cathedral, both exterior and interior, is the first in prominence, as many and varied views may be taken of both. When here we must see Rubens' three famed pictures of the *Crucifixion*. Behind the cathedral is a draw-well with a handsome gothic canopy of wrought iron, the work of the famous blacksmith-painter, Quentin Matsys. Passing that, along a narrow street, we enter the Grand Place, one side of which is occupied by the Hotel de Ville—a plain but imposing structure. The Marriage Chamber and some of the other rooms are well worthy of a visit—one in particular having the walls covered with large pictures by the late Baron Leys, but which, in my opinion, do not add much to his fame. On the other sides of the square are some richly-decorated Flemish houses, six and seven stories high and very characteristic of the style. Some of these formed what we would term the "guildhalls" of different trades—as *La Maison des Charpentiers*, *La Maison des Drapiers*—and are very highly ornamented. Passing through from the north-east corner of the Place, along a winding street lined with similar houses as those described, we pass a curious, lofty, turreted building, which is another hall, and is called "*La Halle a la Viande.*" This was the Butchers' Hall. We now enter *Le Marche au Betial*—a large square, at one end of which is the church of St. Paul, which, with a very plain exterior, presents a noble and finely-proportioned interior, very rich in paintings by Rubens and Vandyke. The walls are covered with the finest and most elaborate oak carvings to the height of about ten feet, presenting every variety of subject, both religious and profane. There are confessionals in each bay, having full-sized statues of apostles and saints on each side, of the most exquisite workmanship, by the famed artists, the Quellins and Vanbrugen. Each compartment or bay would form a picture of itself, and

the whole combined is a perfect treasury of design for carvers and modellers.

Leaving the Marche we glance in at an open passage, and find in what is now used as a common stair a most beautifully-carved oak stair railing, representing the wine-press at work. All the tools used in the coopering trade are very fancifully worked in with the elegant scroll-work which surrounds it, and mark it as having been the guildhall of that trade. Passing up the Rue des Sausisses, with its fine old timber-fronted mansions, we arrive at the site of the old fish-market, some quaint towers of which still remain. We pass under an open archway, and are in front of the old Inquisition House with its dungeons much more terrible in their dark and dampness than either those of Chillon or Venice. The *façade* of this is very picturesque, with its arched portal and corbelled oriel window, and forms a good picture. The interior is now used as a museum of local antiquities. A hundred yards from this is the quay, with a forest of vessels on the river, and the quay itself so littered with goods from want of proper storage as to make it difficult to pass at times. From here, looking along one of the streets, we have one of the finest views of the cathedral.

Returning again by the Place Vert we go on to the Place de Mer, where the royal palace is placed; but turning through a short cross street brings us to the Bourse. It was destroyed by fire, and has only lately been rebuilt. It is well worth a visit. Passing through it we emerge into the Longue Rue Neuve, and a short walk brings us to the Church of St. Jacques. The exterior of this has been much defaced with additions in the *renaissance* style, totally differing from the original work, presenting a very strange mixture, particularly the west front. The interior is, without exception, one of the best-proportioned in Belgium. There are double aisles on the east side of the transepts, and the general view from the nave eastwards is very fine; but the first glance tells that we have got a very difficult subject, from the great variety of colouring in the marble screen and other decorations, including the dark oak, elaborately-carved pulpit. Yet, nevertheless, a dozen different negatives may be taken, all making good pictures. The famous Sir Peter Paul Rubens is buried here in a chapel behind the grand altar, in which there is a large picture of himself and family. This is considered one of the finest of his works. Among the other pictures which the church possesses is a fine picture by Vandyke of *St. George and the Dragon.* JOHN LESSELS.

(To be concluded in our next.)

Meetings of Societies.

EDINBURGH PHOTOGRAPHIC SOCIETY.

THE third and last "popular" meeting of the session was held in Queen-street Hall on the evening of Wednesday, the 15th inst. The attendance, as usual, was very large.

The exhibition consisted of a series of pictures of the animals in the Zoological Gardens in London, interspersed with a large number of views of India.

Dr. JOHN NICOL delivered the descriptive lecture, and stated that, although pictures of many of the animals had been exhibited before, the committee had yielded to the wishes of a number of members and friends to have them shown again. Fearing, however, that an evening altogether devoted to animals might be somewhat monotonous, he had asked Mr. F. York, of London, to whom they had been indebted on previous occasions, to send a number of pictures of Indian scenery to be exhibited along with the animals. Mr. York had kindly sent a very large number, and he had selected sufficient of what he thought most suitable for the purpose for an exhibition lasting an hour and a-half.

The pictures were much admired, and the exhibition was in every respect successful.

GLASGOW PHOTOGRAPHIC ASSOCIATION.

A MEETING of this Association was held on Wednesday, the 15th inst.,—Mr. J. Stuart occupying the chair. After the minutes of the previous meeting were read and confirmed, and seven new members ballotted for, the following questions were handed in for consideration:—

To what is due the sensitiveness and stability of Mawson's collodion?

Is methylated spirit suitable for all photographic purposes? and can it be improved by any easy method?

Why is it that so many carbon prints stick to the glass plate? and what is the remedy?

There was a protracted conversation on these questions. It would be a little difficult to give details of the statements of the various speakers, but shall try to give a general idea.

With respect to the first question—"To what is due the sensitiveness of Mawson's collodion?"—sensitiveness was taken to mean quickness, at least equal to other makers. Stability might mean retaining the sensitiveness for a length of time, or no tendency to become rotten. Mawson's collodion, it was thought, might fairly be considered to possess those qualities. The iodiser was understood to be iodide of ammonium and bromide of ammonium. No collodion would keep well and be sensitive unless made of pure ether, and even Mawson's collodion, it was stated, did not always possess the same sensitiveness. As to methylated spirit: it was considered suitable for all the ordinary purposes of photography, and although putting it through lime or hanging it in a bladder was spoken of as assisting to take away the smell, it was considered that not much good came from those precautions. Then as to carbon tissue sticking to the support instead of retransferring full and freely: it was considered that by careful attention to the details, not letting the paper remain too long or too short a time in the water, the difficulty would soon be overcome.

The Chairman exhibited a large number of carbon prints, also some negatives in carbon suitable for duplicates. The pictures were much admired. The negative process was considered very successful, and would be of great use where many copies were required. At first it was not known whether there were any silver prints among the pictures exhibited. There was a great diversity of opinion as to whether various pictures then exhibited were silver. A number of the members were surprised when Mr. Stuart stated that all were carbon pictures.

Next, a variety of pictures were shown, which Mr. George Croughton, of Lowestoft, had been kind enough to send along with a paper which was afterwards read. The pictures were those lately exhibited at the meeting of the Edinburgh Photographic Society, and consisted of transparencies, negatives, and enlarged prints. They gave a very good conception of the method Mr. Croughton adopts for working up his pictures so as to produce fine, pleasing, and artistic effects upon plain enlarged pictures. The members considered the effects were good, and the plan adopted all that could be desired in the way of simplicity. It was observed that, of course, in that, as in other artistic matters, some skill was required to produce good results.

The paper by Mr. Croughton, entitled *A Few Words About Lighting*, was read [see page 136]. The letter accompanying the paper expressed Mr. Croughton's regret that he had not had more time to prepare it.

The members discussed at considerable length the subject of the construction of glass-houses and the style recommended by Mr. Croughton. Several members thought that in Glasgow it was necessary to have all the light it was possible to get, as there was so much cloudy weather and so much smoke in the atmosphere. Particular reference was made to the three places named by Mr. Croughton; and, although it was considered he was right in his statement about Mr. McKenzie (of Paisley) and Mr. Fergus (of Greenock) having only top light in their glass-houses, Mr. Fergus, of Largs, was understood to have the command of as much side light as he liked, and also front lights. Several members were of opinion that Mr. Croughton was quite right in his view that *quality* rather than *quantity* of light was the real point.

A hearty vote of thanks was proposed and unanimously awarded to Mr. Croughton for his kindness in sending the pictures, and also for his valuable paper.

The Chairman also received a hearty vote of thanks, and the meeting was then adjourned.

PHOTOGRAPHIC SOCIETY OF VIENNA.

AT the last meeting of this Society the annual election of office-bearers took place. Dr. Hornig was re-elected President, Herr Luckhardt Secretary, and Herr Angerer Cashier.

After some remarks from Herr Max Jaffé, with respect to the Vanderweyde studio,

Dr. Hornig read a letter from the President of the *Association Belge de Photographie*, in which M. de Vylder, in the name of the Association over which he presides, thanked Dr. Hornig and the Photographic Society of Vienna for their valuable help and advice, which had contributed so much to the success of the preparations for the late photographic exhibition at Brussels, and begging the Viennese Society to accept the accompanying medal as a memento of the exhibition.

After some suitable remarks from Dr. Hornig M. de Vylder was unanimously elected an honorary member of the Society, as was Herr von Eitelberger, through whose instrumentality the use of the Museum for Art and Industry was obtained for the late photographic exhibition at Vienna.

The annual report was then read, from which it appeared that up to December, 1875, the Society numbered 306 ordinary and twelve honorary members, and that in the course of last year it had lost four members by death.

The President then handed to the members present to whom they had been awarded the Voigtländer medals and those of the exhibitions at Brussels and Vienna.

Dr. Josef M. Eder read a paper upon his observations on the reaction of red prussiate upon metallic silver, following out the special action of ferricyanide of potassium in intensification. [See page 140.] In speaking of the experiments which Captain V. Tóth and himself had made with an alkaline iron developer, he (Dr. Eder) said that lately photographers and photographic journals had given a good deal of attention to alkaline pyrogallic developers, but less attention had been paid to alkaline solutions of protoxide of iron. In 1870 THE BRITISH JOURNAL OF PHOTOGRAPHY mentioned that wet-collodion negatives could be very well developed with an ammoniac solution of ferrous sulphate and citric acid

also that sugar and tartaric acid prevented the precipitation of ferrous sulphate by ammonia, carbonate of soda, caustic potash, &c., and gave rise to clear alkaline solutions of protoxide of iron, which were powerful reducers. According to his (Dr. Eder's) observations the tartaric acid was best adapted for that purpose. The tartaric acid (or tartar) was dissolved in excess of ammonia, potash, or sodic solution, and so much of this solution was added to a solution of ferrous sulphate until the precipitate becomes redissolved. The originally almost colourless solution becomes dark green by absorbing oxygen from the air, and must then be used at once. The silver of both chloride and bromide of silver was very quickly and completely reduced to the metallic state by the iron solution; but the reduction of iodide of silver proceeded with greater difficulty. He regretted that their experiments with that solution was interrupted for the present; but hoped that some other member of the Society might be induced to give an account of his experiences with alkaline iron developer.

The President then showed a collection of tasteful photozincographs and photolithographs by Herr Carl Haack, after which the question—"Are carbon pictures liable to strip off or to be rubbed off, and are they thus less durable than lichtdrucks?" gave rise to a long discussion, in the course of which

Herr Luckhardt remarked that in consequence of the imperfections of the transfer paper, and the complicated nature of the manipulations in the earlier days of the carbon process, the prints might have been liable to peel off, but that, owing to improvements in the paper and simplifications of the process, it was not very likely to happen now. He thought —and Herren Jaffé and Schrank agreed with him—that lichtdrucks were likely to change sooner, as the colour used to create the photographic tone was rolled separately, and was more likely to change or fade.

Herr Jaffé regretted that in lichtdruck and other allied processes the brown tone of photographs was not more nearly reproduced instead of the black tone of engravings.

Dr. Hornig called attention to Professor Husnik's collection of carbon transparencies upon glass.

In reply to a query as to the merits of Steinheil's improved portrait lens, Herr Exner said the lens in question had not yet come into the market.

The meeting was then adjourned.

Correspondence.

CARBON PRINTING.

To the Editors.

Gentlemen,—It seems from several remarks lately made that there is a chance of the destruction of the beauty of carbon prints from the imperfect removal of the chromium salts. The following plan which I have adopted is, I think, safer and cleaner than the usual method. After removing the paper and soaking the print in water at 130 degrees, instead of laving it with the same water with the hand, I use fresh warm water ejected from an india-rubber ball or other syringe. There is no extra trouble in this—in fact, much less; while you can use clean water. Hotter water may be used to certain portions as the development may require, and the whole is worked in so cleanly a manner that I have frequently performed the operation on the drawing-room table without spilling a single drop of water, the messing being done away with.

Another help is a camel's-hair brush to pass over the exposed tissue while softening in the water. I have frequently found minute air-bubbles which the squeegee will not displace. The brush answers best, using the former afterwards.—I am, yours, &c.,

33, *Neville-street, Southport.* J. H. T. Ellerbeck.
March 20, 1876.

THE OXYGEN MACHINE.

To the Editors.

Gentlemen,—I see by The British Journal of Photography of last week you "are still without a description of Mr. Young's oxygen machine." I also see that the report of the last meeting of the Manchester Photographic Society, at page 130, is silent about what took place that evening respecting Mr. Young's arrangement.

When the more important and interesting part of the meeting was over I took the opportunity of telling the members that I understood Mr. Young had taken out a patent for several parts of his apparatus, and that this information should have been given by him when reading his paper, and not kept back till after the exhibition was over, when only about half-a-dozen members were left in the room to see to the packing up.

As Mr. Young was present I wanted him to tell us then what he had patented; but the information was not to be had. I said that if the casing of the plug was part of his patent I had known a casing used in making coal gas upwards of twenty years ago, but that coal gas was not oxygen. I also said that I had not used a casing, because I could not spare room for it in my retorts, and it would prevent the drying of the plug.

Instead of Mr. Young being obliged to me for this information, he wrote me a rather peculiar note next day. I endeavoured to reply in a note dated March 13, and concluded by saying:—"After all, I have a decided objection to any impediment being placed to hinder the free use of the oxygen machine, and the variations of it, which have so often been exhibited and used during the last eight years or more."

This brought another note from Mr. Young, from which I extract the following extraordinary part:—"As you have evidently resolved to do your very worst, and from the very worst of motives or feelings, I shall reserve my reply until the proper time arrives."

This sort of language is beneath my notice; and if Mr. Young means by the "proper time," &c., the publication of his specification, we must wait till then.—I am, yours, &c., M. Noton.
Manchester, March 20, 1876.

TONING TRANSPARENCIES.

To the Editors.

Gentlemen,—On page 82, in the report of the proceedings of the Manchester Photographic Society, mention is made of some slides exhibited by Mr. Woodward which were made on wet plates and treated with chloride of copper. Nearly two months ago I used that plan for making several 7 × 9 transparencies. and succeeded in getting the "Ferrier" tone, with fully as much of that bright transparency in the shadows as their best slides are noted for.

Having also totally failed in getting either the colour or transparency, apparently under the same conditions, I will give some of the points on which success seemed to depend. The plates were cleaned by immersing over night in acid, washed well under a tap, and albumenised while wet. *The albumen solution should not be weaker than one to sixteen*, and the plate should have two applications of it. The first dose, being weakened by the water adhering to the plate, is drained into the sink; the second dose may be drained into the filtering funnel and filtered for future use. The strong albumen applied twice appeared to be the first point.

Collodion treated with caustic potash, one-eighth of a grain to the ounce, seemed to answer best. It, if salted as usual, should be thinned with ether (about one part of ether to three parts of collodion). The plate should have full time in the bath. Give a good exposure, and evelope with—

Sulphate of iron and ammonia	480 grains.
Water	24 ounces.
Acetic acid	3 to 5 drachms.
Glycocoll* solution	1 to 1½ ounce.

Develope to get detail in the high lights and more density than usual, as the subsequent treatment will give the necessary transparency to the shadows. Fix with cyanide, and treat with chloride of copper as directed by the Editors in the article *On Intensification*, pp. 277 and 278, June 11, 1875.—I am, yours, &c., Dry Plates.
Philadelphia, March 4, 1876.

ORGANIFIED PYROXYLINE.

To the Editors.

Gentlemen,—It is one thing to provide matter for observation, and another to provide the peculiar matter which enables its possessor to comprehend what is meant. I have only done the former, and trust to be excused when I plead inability to accomplish the latter. If Colonel Wortley *will* read aright, I did neither attack, defend, nor offer opinion, contenting myself with asking that judgment should not be given against Mr. J. W. Gough when he is not here to defend himself against what, practically, amounts to saying he has "aired" himself before your readers in borrowed plumes; still this may be the kind of victory desired, but I will say it is ignoble. Surely it is not asking too much of Colonel Wortley, considering the laurels he already wears, to wait a short time before he gums a fresh "strawberry leaf" to his crown.

What may be of moment to Colonel Wortley does not in the least concern me; yet here I must make another plea, and that is, an absence of such vanity as to offer an opinion upon what is or is not of interest "to the general body of your readers."—I am, yours, &c.,
Halifax, March 18, 1876. W. E. Batho.

EXCHANGE COLUMN.

* The glycocol solution is made as follows:—100 grains of Nelson's opaque gelatine is covered with water and allowed to soak for a few hours. It is then heated on a sand or water bath until dissolved completely; add ten grains of caustic potash dissolved in water, and boil for a few minutes, or until flocculent matter forms. Dilute with water till it measures ten ounces, filter, and it is ready for use.

ANSWERS TO CORRESPONDENTS.

☞ *Correspondents should never write on both sides of the paper.*

A. N. W.—We shall submit your letter to Mr. Howard.

LENO.—A mixture of paraffine and wax will answer for coating a wooden bath.

S. M. T.—The spots on the prints are caused by the imperfect removal of the hyposulphite of soda.

AMATEUR (Newport).—Try another sample of collodion, and ascertain whether your silver bath is of the proper strength.

R. T. J.—1. The dealer you name may be quite depended upon.—2. The manual is at present out of print.—3. Yes.

A LIEUTENANT.—The best colloid body for your purpose is chondrine. It possesses several properties not held in common with gelatine.

SEYMOUR CONWAY.—A pamphlet on the subject of Mr. Sutton's wet bromide process is published at the office of this Journal—price one shilling.

A. NOEL.—We have not heard of any bad result arising from the wetting of the wood, and we know that the process we indicated is much practised.

N. W. FRITZ.—The question you propose is one that can only be properly answered by the maker of the plates. Try the effect of working with less light in your dark room.

REV. J. BARTON.—Sensitise the paper first on a forty-grain silver bath, then float upon water, followed by floating upon a bath composed of five or six grains of alum to the ounce.

AUCKLAND (Leeds).—Full details concerning the nature and the means of obtaining Kennett's pellicle will be found at the foot of each page of the calendar in our ALMANAC for the current year.

B. R.—Moulded glass corners for dark slides may probably be obtained from several dealers. Some that were laid on "our editorial table," nearly four years ago, were sent by Mr. J. Werge, of Berners-street.

J. BENSON.—Messrs. Sarony and Vanderweyde did not break faith with their licensees, for we have the best means of knowing that the patent was not allowed to lapse at the end of the third year, but was renewed for a term of four years more.

J. P.—The discrepancy is easily explained. A pound avoirdupois contains 7,000 grains, while a pound troy contains only 5,760. We need scarcely remind you that by the former system there are sixteen ounces to the pound, while by the latter there are only twelve.

AULD REEKIE.—Yes, it is our intention to publish full details of Mr. A. L. Henderson's process of enamelling, but not just at present. We have carefully read the various articles descriptive of enamelling pointed out by you, and have merely to remark that Mr. Henderson's process is different from any of them.

W.—1. There is no reason why the prints should not adhere to the mounts. The fault must be with the starch.—2. A portrait lens is best for enlargements.—3. The back lens must be next to the object to be enlarged.—4. The print is a little more transparent.—5. Float upon a ten-grain solution of citric acid. The paper will keep well, but tone very slowly.

S. L. P. S.—It is not the fault of the burnisher that your carbon prints have been destroyed when subjected to its action. Attention was directed by us a few months ago to the fact that, before carbon prints can be burnished by the Weston or other hot burnisher, it is necessary that such prints be previously made hot, so as to ensure their being perfectly dry.

ARTIST.—We congratulate you upon your success. The negative (which has been returned as directed) is most excellent; and we do not entertain the least doubt that after persevering in the practice of photography for two months longer you will have acquired such a degree of facility in manipulative details as to qualify you thoroughly for the post mentioned.

T. P. P.—The desired alteration can be effected without impairing the other good qualities of the lens. It would, however, be necessary to subject it to a careful examination before we could offer any advice of a definite nature. Cannot you manage to send it to our office? As regards the bronze mounts, all that is necessary is to avoid the back of a print coming into contact with the face of another while it is wet.

JOSHUA BARCLAY.—Transparencies of a claret tone may be produced at pleasure by attending to the following directions:—Use a newly-*iodised* collodion, a bath that is quite neutral, and a developer composed of two grains of pyrogallic acid and fifteen minims of glacial acetic acid to the ounce of water. Fix with a very weak solution of cyanide of potassium; for, the deposited silver being very fine, a strong solution might injure the weak half-tones.

MISS LOGAN.—We are quite well aware of the fact that views of Venice may be purchased at the low price you mention—nay, we are aware that they may be purchased retail *in* Venice at prices lower by thirty-three per cent. than those quoted by you; but it is quite out of our power to give you "any good and valid reason why photographers in our own country should charge such high prices for home views." We are tempted to dispute the alleged fact that landscape photographs of "our own glorious scenery" cannot be purchased unless at exorbitant prices; for we have a perfect recollection of our making a selection of views in the lake districts from a printed and priced catalogue, and being quite astonished at the low prices at which photographs of so high a class could be purchased.

P. G. B.—The following is the synopsis of Captain Abney's beer and albumen process for which you have expressed a desire:—Collodionise and excite in the usual manner, then wash thoroughly and apply to the surface a preservative composed of white of eggs well beaten up, to which is subsequently added a certain proportion of beer in which pyrogallic acid has been dissolved. When dry the plates keep well and are tolerably sensitive. The development is effected by the alkaline method. We have here abstained from giving proportions, as we strongly recommend you to study and be guided by the very explicit directions for practising this process given by Captain Abney in the number of this Journal for March 19, 1875, in which, at page 136, will be found complete formulæ.

SUBALTERN.—The inside of the camera may be blackened either by the application of spirit varnish and lampblack or by means of staining. The latter method is, of the two, that which should be preferred, because there is no chance of any particles of black getting removed and so being present in the camera in the form of dust or chips. The best way to stain the camera is to brush it over first with an infusion of nutgalls and logwood, and then, when that is dry, with a solution of sulphate of iron. After the wood has become perfectly dry it is rubbed over with one part of linseed oil diluted with two parts of turpentine.

E. H. J. says:—"I have seen a formula for a retouching varnish composed of four drops of 'balsam of fir' dissolved in an ounce of turpentine. With this mixture, and by means of a tuft of clean cotton, the surface of the previously-varnished negative is to be moistened, and after becoming dry it will take the pencil with great ease. Will you inform me what is meant by 'balsam of fir?' I have sent for it to several oil and chemists' establishments, but cannot obtain it."——The term is only a synonym for *Canada balsam*, which dissolves freely in turpentine, and certainly possesses the good qualities claimed for it in connection with retouching.

G. J.—You do not seem to apprehend the true position of the matter. The proprietary right in the copyright of a picture is different from a similar right in the negative. A may be the owner of the negative, but this negative is entirely useless to him so long as B, who possesses the copyright of the subject, refuses him permission to print from it. But A may say that he holds the key to the position, for without his negative the copyright belonging to B is useless. This is not the case; for the latter may have a proof of the picture worked up and enlarged, and other negatives taken from it, by which means he will be enabled to supply the anticipated public demand. You are also wrong as respects the application of the law of copyright to paintings and engravings. It does not follow that because you have purchased an original oil painting that you thereby acquire the right of reproducing and publishing it.

NOMAD.—Received. In our next.

MORLEY'S NEW CATALOGUE.—We have to acknowledge the receipt of Mr. Morley's new price list of choice, first-class photographic lenses, cameras, and other apparatus. We have, in noticing previous editions of this valuable compendium, directed attention to the wonderful diversity of its contents; and we have merely to add to what we have already said that the present is, if possible, more complete and suggestive than any of its predecessors, the variety of articles in stock being simply wonderful.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.—An explanation is due to our readers for our inability to publish in the current number, as promised, the paper read by Mr. L. Warnerke at the last meeting of this Society. We were unable to procure an advanced slip of the paper, and the Society's journal only reached us yesterday forenoon, too late for the reproduction of Mr. Warnerke's paper this week; thus the private journal of the Society, which only circulates amongst its members, becomes the cause of withholding for a considerable time from the general photographic public information which would otherwise have been communicated by the independent journals two or three days after the meeting at which the paper was read, and which took place on the 14th instant. We think it right to make the suggestion that it is desirable, when the publication of the Society's journal is unavoidably delayed, that the publishers should forward advanced slips of the papers to the other journals, in order that the readers of our photographic literature throughout the world may reap the benefit of communications made to the Society with as little delay as possible.

METEOROLOGICAL REPORT,

For two Weeks ending March 22, 1876.

Observations taken at 406, Strand, by J. H. STEWARD, Optician.

THESE OBSERVATIONS ARE TAKEN AT 8.30 A.M.

March.	Bar.	Wind.	Wet Bulb.	Dry Bulb.	Max. Tem.	Min. Tem.	Remarks
9	28·91	W	35	39	46	36	Cloudy
10	28·72	SW	38	40	47	35	Cloudy
11	29·07	W	39	43	51	38	Cloudy
13	29·63	NW	35	37	48	32	Dull
14	29·59	W	45	47	56	35	Dull
15	29·27	NW	42	42	—	41	Raining
16	29·64	NW	38	41	50	34	Fine
17	29·72	NW	33	38	46	34	Dull
18	29·99	N	33	37	42	31	Fine
20	30·07	N	—	33	40	29	Dull
21	29·96	NW	—	33	39	30	Dull
22	29·90	E	—	33	—	29	Dull

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THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 830. Vol. XXIII.—MARCH 31, 1876.

ON PRESERVING SENSITISED ALBUMENISED PAPER.

Printing is one of the operations in photography which is looked upon by various operators in very different lights. One class is only too apt to consider that the negative once obtained the rest is a mere matter of routine—that, in fact, the printing, toning, and fixing may be delegated to the merest novice. These persons, however, generally finish by discovering that printing upon albumenised paper requires something more than simple rule of thumb work—that it requires, perhaps, as much artistic skill and attention as the production of the negative if really first-class results are required. Another class looks upon it as little better than a nuisance, and these are chiefly to be found amongst amateurs. Certainly to an amateur photographer whose printing requirements are frequently very limited it must generally be a great nuisance to have to go through the work of filtering the bath, floating, draining, and drying the paper, and then returning the bath solution to its proper receptacle for the sake of, perhaps, half-a-dozen prints, which only occupy as much time in the printing-frames as does the preparation of the paper, whilst the same amount of preliminary trouble would suffice for a dozen times the amount of work.

To prepare at one operation a sufficient quantity of paper to last for a considerable time is not, unfortunately, always an available remedy, on account of the rapid discolouration, especially in hot weather, of the paper after it has been sensitised. We are well aware that at the present time ready-sensitised papers may be obtained commercially which will retain their good qualities unimpaired for several weeks or months if properly stored, and thus relieve the amateur of all trouble in sensitising; but we are acquainted with many amateurs who scorn to have "their work done for them," and who would scarcely consider pictures really their own unless they themselves had performed each individual operation in their production. To such we can only recommend the adoption of one of the numerous methods of preparing the paper so that it may be preserved ready for use for a lengthened period, and in a state in which it is capable of producing as good results as when freshly sensitised. We shall now briefly recapitulate the various methods which have been recommended from time to time.

The oldest and, perhaps, the simplest method of so preserving paper after sensitising consists in storing it, after silvering and drying in the ordinary manner, in an air-tight box or case containing in a separate compartment fused chloride of calcium. The latter salt produces a perfectly dry atmosphere by absorbing any slight moisture which may be present, and prevents the decomposition of the silver salt, to produce which a certain amount of moisture is necessary. The objections to this plan are that the preservative case is liable to get shaken, and minute particles of the calcium chloride attach themselves to the surface of the paper, causing spots and blemishes, while it has been asserted by some that paper kept in this manner refuses to tone or requires a very much larger quantity of gold to produce the desired result. Others, however, assert that the last defect may be obviated by exposing the paper to the atmosphere for a short time before placing it in the pressure-frame in order that it may absorb a little moisture.

Diverging from the chronological order of the suggestions made for the preservation of paper we may mention the plan of keeping it, after it has been sensitised and dried, between pads of thick blotting-paper which have been saturated with strong solution of carbonate of soda. This method, though not possessing equal advantages with some others in point of time during which it will keep the silvered paper in good condition, is, nevertheless, said to be very useful when it is only necessary to keep the paper for a few days; but it has been asserted that the effect of the carbonate of soda is to give a "measly" appearance to the prints if allowed to act for any length of time. This, however, may possibly be rather the effect of damp than of any deleterious effect exercised by the soda. Blotting-paper saturated with citric acid has also been used in the same way, and, though so different in composition to the last-named substance, it is credited with nearly identical results.

We now come to the various methods based upon the special preparation of the bath, and will first briefly notice one or two principles upon which the keeping qualities of the paper have been found to depend. The discolouration which takes place after the albumenised paper has been in contact with silver nitrate arises from the spontaneous decomposition of that salt in the presence of organic matter, which decomposition takes place with greater or less rapidity according to the quantity of free silver nitrate left in the paper, as well as the temperature and moisture of the atmosphere. The presence of an acid in the bath—especially an organic acid—retards considerably this discolouration, as do also certain other substances which will be mentioned; hence numerous modifications have been made in the constitution of the sensitising solution, either as regards its strength or by the addition to it of one or other of such retarding substances.

The most obvious method of increasing the time during which the paper may be kept lies in decreasing the strength of the bath, but this, unfortunately, possesses disadvantages which more than counterbalance any good effect observable. These consist chiefly in the production of thin prints possessing no depth in the shadows, with a granular, "mealy" appearance when toned, and which also require more gold and a greater length of time to perform the toning process. Fuming the paper with ammonia—an operation of American origin, which will be more fully spoken of later—lessens to a certain extent these disadvantages; but, though comparatively weakly-silvered paper may be made to produce vigorous prints after fuming, the gain in the keeping qualities is so small that that method must be considered of little practical utility for the object in view.

Of the substances added to the bath nitric acid probably dates farther back than any other; but this, while only preserving for a short time the sensitive surface, is liable to the same charges as the foregoing plan, besides acting injuriously upon the albumen film. Acetic acid acts a little better, but is subject to similar defects. Citric acid may be used with advantage, as it gives prints of great vigour and of good colour, having, at the same time, less retarding action upon the toning; but if used in sufficient quantity to produce a very decided preservative effect it is apt to lead to uncertainty and waste in consequence of the formation in the bath of insoluble citrate of silver. Sugar exercises a peculiar action; for, while it acts

to a small extent as a preventive of the usual decomposition, its chief advantage lies in the fact that paper which has become decidedly coloured by long keeping loses its abnormal tint during the operations of toning and fixing. A bath which we employed some years ago consisted of nitrate of silver forty grains, nitrate of potash twenty grains, and loaf sugar five grains to each ounce of water. With this bath we have prepared paper which has given prints with perfectly pure whites, after keeping for over three weeks during the summer, though before toning a decided yellow tinge pervaded the whole; and if the paper were not salted too strongly, the depth and clearness of the tones were all that could be desired.

Another formula, published some years since (by whom we at the present moment forget)—one of the advantages of which was that it conduced to the keeping qualities of the paper—consisted of the nitrates of silver and copper combined. We tried this at the time of its introduction, but do not recollect that any special benefit arose from its use, except that it rendered possible the employment of a weaker silver solution. Upon the latter property, in fact, the last two or three plans depend, and the advantage accruing therefrom is so comparatively slight that paper thus prepared can only be safely kept very few days in hot weather, and even then requires to be carefully protected from atmospheric influences as far as possible. The succeeding systems, however, based upon the after-treatment of the silvered paper, render it possible to preserve its purity during several months, and that without materially interfering with the subsequent action of the toning solution.

The first we shall mention consists in floating the sheet of paper, after its removal from the silver bath, in a dish of distilled water for a limited time, so as to free it from at least the great portion of the adherent silver solution. It may be asked why this mode of treatment should confer greater keeping qualities without ill effect than the use in the first instance of a weak bath. The answer is obvious enough: a solution of silver nitrate so dilute as to leave no more of that salt in the paper than is to be found in a washed sheet would not only produce pictures of a feeble and mealy appearance, but would be incapable of coagulating the albumen film. Paper prepared by washing preserves its purity for a lengthened period, but requires care in storing, and is, besides, greatly improved by ammonia fuming immediately before use. The combination of chloride and carbonate of silver without free nitrate was introduced as forming a sensitive surface possessed of every good keeping quality, but incapable of producing a practically useful image without first undergoing the process of fuming. To prepare the carbonated paper ordinary albumenised paper is floated first upon the usual silver bath, afterwards upon solution of bicarbonate of soda, and, finally, upon plain water. When thoroughly dried it will keep for several weeks, and upon exposure gives but a faint and unsatisfactory image. Fuming with ammonia is, however, stated to produce upon this paper pictures possessing all the usual vigour, and with as short an exposure as the best albumenised paper when newly prepared. A few experiments made some time ago, however, failed in our hands to confirm these results, though we can scarcely say that we hold them as conclusive.

The last method we shall mention, and which has given in our own hands the most satisfactory results, is the plan of floating the paper, after it has passed the silver bath, upon a solution of citric acid. The strength of the solution is immaterial, depending upon the time of year, the strength of the bath, and the length of time the paper is required to keep. From five to ten grains to the ounce of water have been recommended, and the former strength we have found ample for all the requirements of either the amateur or professional photographer. The citric acid when thus applied forms citrate of silver *in the paper*—not in the solution, as would be the case if a sufficient quantity were added directly to the bath; hence the advantage of applying it after the silver chloride has been formed. We have kept paper prepared in this manner for more than two months without noticing any deterioration in its qualities. Fuming with ammonia will in some cases prove beneficial, more especially when the paper has been long kept, but is not absolutely necessary.

If the fuming process be adopted it is very important that the paper be perfectly dry when exposed to the ammoniacal vapour. If this be not the case the paper will either discolour under the action of the alkali, or the prints will be "mealy" and unequal in tone. The operation is performed by suspending the sensitised paper in a box or case in which is placed a vessel containing liquid ammonia, or a few lumps of fresh carbonate of ammonia. An alternative method is recommended by some, namely, fuming the pads which are placed behind the paper in the pressure-frame; these may be "fumed" in the same manner as the paper, and should be perfectly dry.

RECENTLY PATENTED INVENTIONS.

No. VI.—PHOTOGRAPHS IN COLOURS.

This invention is a communication from abroad by *La Société Anonyme de Publications Periodiques*, of Paris, and relates to a process for the production of polychromatic or multicoloured photographs in any required number, and from plates obtained in such a manner that these coloured pictures are the result of the agency of light acting through plates prepared for the purpose, and without their various colours being arranged by the aid of the pencil or brush.

At this stage we may observe that the invention we are about to describe is substantially that of M. Leon Vidal, which, a few years ago, was brought prominently before the notice of our readers and the public by the late Mr. Sutton, ourselves, and others, and which was described in detail at the Bradford meeting of the British Association. The name of M. Vidal is not once mentioned in the specification, nor is there any allusion, even in the most indirect manner, to the labours of that gentleman. But we shall not further anticipate.

By means of the process now to be described polychromatic images are obtained suitable for viewing as transparencies or by reflected light in the usual manner. Starting with the admission that between these images and those obtained by chromo-lithography there exists a great analogy as regards the method of their production, the patentee explains that, whilst in chromo-lithography it is necessary to have recourse to manual drawing and composition, it is, in the case of this improved process, simply required to employ plates obtained in the camera or by contact printing, and to produce from such plates positive proofs, either by the action of light producing each monochrome by the carbon or pigment printing process, or by the mechanical means of printing applied for obtaining prints without further exposure to the light.

The following is given as a specimen of one mode of carrying this invention into effect:—From a given negative there are obtained as many similar negatives as are required, the number of these being determined by the number of colours to be combined together. These negatives are arranged in such a manner that, by applying with a pencil a sufficiently opaque colour, various parts of the plate are covered. For example: on the plate which should give the monochrome yellow all the parts are covered which are *not* to contain yellow in the condition either of a simple or composite colour. Upon the plate which is required to furnish blue only the whole of those portions of the surface are covered which are not to be blue or a combination in which blue forms an element; and in a similar manner with each of the other negatives intended to furnish respectively the monochromes red, brown, or other colour as required. These reserved portions are arranged agreeably with the taste of the artist, according to the result which it is desired to obtain. The negatives thus prepared are printed from separately. With the yellow negative a monochrome of that colour is printed upon a yellow pigmented tissue; and so with the other plates, using tissues of blue, red, or other colour, as the case may be.

The development of the images is effected in a manner similar to that in which it is performed in the carbon process; but, as a temporary support, stearine paper or a polished metal plate covered with a fatty substance may be employed. The various portions having been all developed the mounting of the polychromatic image

may be proceeded with by the juxtaposition of the proofs, as we shall presently describe, the "registration" of the various parts being kept by means of certain marks previously made on the original negative. The mounting is performed by immersion in water—first of the sheet of paper or permanent support, then of the monochrome which it is desired to apply first. The permanent support is covered with a thin sheet or layer of gelatine which is softened by the water, as also is the layer which forms the monochrome; and when they are brought together by the aid of suitable pressure and left to dry spontaneously the adhesion of the two layers is complete, whilst the temporary support is detached, the image it previously bore having been transferred to the permanent support. After this operation has been completed all the other monochromes are applied and transferred in a similar manner, the surface of the picture being washed, by means of benzole or ether between each application of colour, in order to ensure the removal of any fatty or resinous substance which might adhere to it on its being separated from its temporary support. When the whole of the monochromes have been thus mounted the completed picture is immersed in a solution of alum, and after being rinsed with water it is finished.

Variations on the method just described are also specified. For example: in lieu of employing the action of light to obtain each monochrome typographic or lithographic processes may be substituted therefor in order to obtain a series of superposed tints of various colours, including metal—such, for example, as silver, gold, and the like—combined in such a manner that their united effect, added to a final shade supplied by photography with the carbon process, produces the desired result. The mechanical means for printing in colours may be employed, either previously to any carbon impression by photography or subsequently to the same, in such a manner as to superpose tints of various colours upon the photographically-printed image. Or these two modes of producing the impression may be employed with a view to the final result in such a manner as to obtain, first, the photographic impression, then the lithographic or typographic impression, for example (or *vice versâ*), then another photographic impression, and again a lithographic or typographic impression, and so on in succession. These various processes employed alternately in this or any other suitable manner contribute by their action to form one and the same picture.

With regard to the impression of various colours it is important to observe (says the patentee) that heretofore only the mechanical means hereinbefore referred to, and which consist of lithography, typography, and engraving, have been employed for the purpose; but according to this invention the before-mentioned processes are applied in combination with photography in order to obtain by the juxtaposition of photographic proofs upon lithographed or engraved colours or tints pictures or images representing not only the exact forms of the objects, but also their colours. In lieu also of employing a single photographic monochrome two or more monochromes may be used, which by juxtaposition unite to form the picture or image by combining with tints or colours printed mechanically.

The process may be commenced by printing mechanically the various tints or colours in order to superpose the photographic proof thereon, or by printing mechanically upon the photographic proof the various tints or colours which are requisite for its completion, or a similar result may be obtained by alternating the two systems, as hereinbefore stated, the order being varied in any suitable manner.

The specific "claim" in this invention will be understood from the following:—"What I consider to be novel and original, and therefore claim as the invention secured to me by the hereinbefore in part recited letters patent, is the production of polychromatic pictures or images either by the superposition of a series of photographic impressions obtained in the manner herein set forth, or by the employment of photographic impressions in combination with lithographic or other impressions, substantially as hereinbefore described."

That M. Vidal is entitled to all the credit of having initiated and worked out the invention just described no one will for a moment deny; but we imagine that owing to a law connected with patents which is recognised in this country—to the effect that no valid patent can be obtained for an invention which has previously been made public—a very grave difficulty in maintaining the patent would be encountered. Our reason for indulging in this supposition is the fact of the invention having been *repeatedly* described with a considerable degree of minuteness in THE BRITISH JOURNAL OF PHOTOGRAPHY, *The Times*, and other daily newspapers, the *Popular Science Review*, and other scientific journals, several years antecedent to the date of the application for the present patent, which is that of May 4, 1875, the (nominal) patentee being Mr. J. H. Johnson.

THE use of catechu in connection with gelatine emulsion is, without doubt, an important addition to the resources of those who desire a thoroughly trustworthy and easily-worked gelatine process without aiming at too high a degree of rapidity. It has never previously been put to any practical use as a preservative; for, although it has been tried with collodion plates, it offered no special advantages over tannin. If, however, the results recorded by our correspondent, "F. S. K.," in another column be confirmed by the experiments of others it promises to become of very great use, producing very similar results and, indeed, taking the place of tannin in connection with gelatine emulsions, to which the latter substance is inapplicable on account of its coagulating power. That such a substance would be found we have had no doubt, and catechu appears to conform to the requirements. It is itself a substance analogous to tannin, with general properties very similar, being one of the most powerful vegetable astringents; but it differs in one important respect from tannin, inasmuch as, according to "F. S. K.," it does not produce an insoluble precipitate with gelatine. It is in this respect we may hope to find it of use; but our correspondent has hopes that it may prove to be a "preservative" of a different description. We are scarcely inclined to agree with him on that point without further proof, as we consider the keeping of his emulsion for six weeks to depend more upon the time of the year than upon any peculiar function of the catechu. We have kept a gelatine emulsion for at least that length of time without having recourse to any preservative matter whatever. One point in "F. S. K.'s" formula strikes us as curious, namely, that in preparing the emulsion the silver and bromide are to be respectively added, and, "when well mixed," the pyro. and gallic acid solution is to follow. Now, as nothing is said about using any restraining acid to prevent the reduction of the unconverted silver nitrate which must exist for at least a few hours, it follows that, in order to produce a clean emulsion, the gelatine itself must act the part of restrainer. In our experiments we have always employed an acid in the gelatine, having found it quite indispensable when using collodion. If, however, it be unnecessary, we have one more point of difference between collodion and gelatine with respect to their action not only upon the silver salts but upon chemical combination generally.

FURTHER RESEARCHES RESPECTING THE INFLUENCE OF VARIOUS BROMIDES ON THE COLLODION EMULSION.

[A communication to the Photographic Society of Great Britain.]

IN pursuance of my experiments described at the last meeting of this Society the following eleven salts were investigated:—

1. Bromide of calcium.
2. Bromide of barium.
3. Bromide of strontium.
4. Bromide of lithium.
5. Bromide of copper.
6. Bromide of magnesium.
7. Bromide of manganese.
8. Bromide of methylal.
9. Bromide of naphthaline.
10. Bromide of ethyl.
11. Bromide of quinine.

No. 8 is a solution of one drachm of bromine in one ounce of methylal—a colourless liquid of very pungent smell, but quite different from bromine, provoking discharge from the eyes and nose.

The following are the combining proportions with silver, expressly determined for the samples of salts investigated:—

	Calcium Bromide.	Barium Bromide.	Strontium Bromide.	Lithium Bromide.	Copper Bromide.	Magnesium Bromide.	Manganese Bromide.	Methylal Bromide.	Naphthaline Bromide.	Ethyl Bromide.	Quinine Bromide
								Min.	Min.		
Quantities necessary for conversion of 1 grain of silver nitrate	0·80	0·95	0·985	0·659	0·665	0·865	0·746	2·115	8·66	?	2·5
Silver nitrate necessary for conversion of 1 grain of bromide	1·250	1·052	1·014	1·517	1·503	1·155	1·340	.	...	?	0·400

All these salts are very soluble in alcohol except barium, which is not perfectly soluble.

In the preparation of the emulsion all conditions, as far as possible, were maintained identical with those formerly described, viz. :—Collodion made with eight grains of high-temperature pyroxyline in one ounce of equal proportions of alcohol and ether; seventeen grains of nitrate of silver per ounce of emulsion in alcohol and water were added, and various bromides were calculated, so as to convert fourteen grains of silver nitrate. *Aqua regia* was added in quantity to convert one grain of silver; after twenty-four hours' standing the emulsion was spread on glass (when set), washed, dried, and re-emulsified in the equal proportions of ether and alcohol; twenty grains of dried pellicle per ounce of solvents.

As on the former occasion, the appearance of different emulsions varied considerably. The most opaque were barium and methylal; lithium was the thinnest.

The equivalent of ethyl-bromide, unfortunately, was not determined, because this salt, when added to the aqueous solution of nitrate of silver, after six hours did not give any perceptible precipitate; so I added it at random to the collodion, about ten minims per ounce. After ten days' standing, with occasional shaking, the emulsion looked rather thinner than any of the others; but in washing it was discovered that the emulsion contained excess of bromide.

The behaviour of the quinine bromide was quite unexpected; for when added to the collodion it instantly *solidified* it. I purposely italicise the word "solidified," because it was not a precipitate, so well known to early emulsion workers; but all the mass became solid, just as if alcohol and ether were not present. This is a property of pyroxyline never before observed, and which may find some practical application in the future.

When exposed before washing, calcium, strontium, and lithium gave a very good and clear image; all the rest were foggy.

Further experiments proved also that emulsion prepared from calcium, lithium, and strontium with excess of silver does not require even *aqua regia* to counteract the fogginess.

After washing, all the samples gave good and clear negatives, but varying considerably in sensitiveness, intensity, and colour.

The following is the approximate classification according to the various qualities observable :—

Opacity of the Film.—Barium, calcium, methylal, lithium.

Sensitiveness.—Barium, calcium, manganese, lithium, magnesium, strontium, methylal, copper, ethyl, naphthaline.

Intensity.—Copper, lithium, barium, magnesium, strontium, manganese, methylal, calcium.

Blue under the Action of Daylight.—Calcium, methylal.

Brown under the Action of Daylight.—Barium, magnesium, lithium, manganese.

Slate-grey under the Action of Daylight.—Strontium, copper.

Greenish Grey under the Action of Daylight.—Naphthaline, ethyl.

Visible Action under the Yellow Glass.—Calcium, naphthaline, barium, strontium, copper, lithium, manganese, magnesium, ethyl, methylal.

Observing some excellent qualities in the emulsions forming my present subject of investigation, I compared them with those previously described, and found that barium, manganese, and calcium can be favourably compared with zinc. Even barium is rather more sensitive than zinc. Strontium and lithium gave also excellent results. It is a little less sensitive; but certainly in the preparation it never fogs, and a brilliant and vigorous image is ample compensation for this little defect. From the examination of general specimens an unfavourable opinion would be formed of copper emulsion, because the development in this case is very slow; but in other emulsions we cannot secure by prolonged development so many good qualities as we like to see in a successful negative, preserving indefinitely perfect transparency in the darkest parts. I imagine that addition of copper to some other more sensitive bromide (calcium, for example) would secure the best results.

I may state on this occasion that, in my judgment of different emulsions, I did not satisfy myself with comparison by a single negative, but I adopted the most suitable developer in each case, and only after comparison of several results formed an opinion.

Difference between visible action produced by daylight and by light passed through a yellow glass naturally tempted me to solve the question—What is the influence of different bromides on the invisible but developable action produced by the coloured rays? With this object in view several bands of coloured paper were pasted on to cardboard with the name of the colour written in black; narrower strips were pasted across, so that by these means every colour could be observed in contact with all the others, and that facilitated comparison of the actinic action in the negatives. Separate negatives were taken on each emulsion, which are now on the table for comparison. The variation of intensity and sensitiveness of different emulsions makes it extremely difficult to form a judicious classification; but even at the first glance it is unmistakably evident that the various bromides in the emulsion produce marked variations in the sensitiveness to different coloured rays.

The following is the list in order of sensitiveness to the less-actinic colours:—Na, Zn, Cd, K, NH_3, Li, methylal, ethyl, Ba, Ca, Mg, Br, Cu, Sr,......U, Fe, Mn. I am not at present in possession of a suitable spectroscope to test the sensitiveness of my emulsions to the different lines of the solar spectrum; but, considering that by the addition of coloured substances to the emulsion marked effects were produced in photographing the solar spectrum, and yet no difference was observed when coloured pigment was photographed, I imagine that, if my experiments were repeated with the solar spectrum, more definite differences would be observed.

These further researches confirmed me still more strongly in the opinion expressed on the last occasion, that haloid bases exert a powerful action on the pyroxyline in the collodion. The Editors of The British Journal of Photography, in their highly-flattering criticism, call this action "ageing." It seems to me, however, that there remains in the emulsion, notwithstanding washing and drying, some more tangible trace of the haloid salts used than merely catalytic action; and in proof of this I take, for example, methylal emulsion, also washed, dried, re-emulsified, and dried on the glass again, yet it reveals to the sense of smell what was the substance used in the preparation of it. Here I must notice that methylal and methylal bromide are perfectly soluble in water; and the washing was exceptionally long and thorough, to avoid torture to the eyes in drying.

Another example I should not like to omit is ethyl-bromide emulsion. The collodion, which was powdery and rotten, became so contractile that it could not be kept on the glass, but cracked as soon as it became dry. But in connection with this emulsion another remarkable fact is worth noticing. The ethyl film, when examined by transmitted light, presents the most curious phenomenon of dichroism—rose and beautiful green light are transmitted according to the angle of observation; when it is kept quite close to the eye only green colour is transmitted through the dry film and rose through the wet.

The examination of unwashed ethyl emulsion is still more curious. When the glass covered with this emulsion is heated the film acquires, according to the intensity of the heat, the power to transmit all the colours of the spectrum (and these are most clear and vivid) in the following order, beginning from the highest temperature :—Yellow, orange, red, violet, blue, green.

I am at present investigating the action of heat on the emulsion, and I hope that dichroism and thermochroism of ethyl emulsion will be of great use in these investigations. L. Warnerke.

EXPERIMENTS WITH BROMIDE OF SILVER.

I have just concluded a series of experiments on the sensitiveness of bromide of silver, and I think I have established the following facts :—

1. Pure bromide of silver spread on glass is reduced in sensitiveness by the addition of any organic matter, such as is usually called a "preservative."

2. Bromide of silver formed in the presence of certain kinds of organic matter is more sensitive than pure bromide.

I have worked out these experiments in three ways:—Firstly, with emulsion made in the ordinary way; secondly, by the bath process; and, thirdly, by sensitising the collodion in bulk by means of a silver bath, and afterwards washing and emulsifying it. By working in all these ways I think I have avoided accidental causes of error.

The latter of the three processes—that is, forming bromised collodion into a pellicle and then sensitising it—has shown me some very curious and interesting results, and I shall take an early opportunity of bringing them forward. H. STUART WORTLEY.

MODIFIED GELATINO-BROMIDE PROCESS.

It was with much interest I read in THE BRITISH JOURNAL OF PHOTOGRAPHY for March 17 your article on *Organifying Gelatine Emulsions.* I have been working in this direction the past two winters, and with what degree of success you will be able to judge from the process I now send, if you think it worth your attention. I do not give it as a *very sensitive* process, but think it is well worth the attention of landscape photographers and others who are content with securing good results at the loss of a little sensitiveness. You will observe that I use *catechu*, which does not coagulate gelatine, but appears, nevertheless, to combine with it, as the finished emulsion shows by its colour. I think it will also act as a preservative, as some emulsion made by this process is now, after more than six weeks, as sweet as when first made.

The following are the formulæ I use for the emulsion:—

A.

Bromide of cadmium	11 grains.
,, potassium	8 ,,
Nitrate of silver	20 ,,
Nelson's opaque gelatine (clarified)	32 ,,
Distilled water	2 ounces.

B.

Pyrogallic acid	½ grain.
Gallic acid	2 grains.
Distilled water	2 drachms.
Or—Pyrogallic acid	½ grain.
Gallic acid	2 grains.
Alcohol	2 drachms.

Dissolved with heat. The aqueous solution will deposit surplus salts on cooling.

C.

Catechu	3 grains.
Distilled water	1½ drachm.
Or—Catechu	3 grains.
Alcohol	1½ drachm.

The bottle containing either of these is placed in heat for two hours, and the decoction or tincture filtered.

To make the emulsion proceed as follows:—Place six grains of the gelatine in a collodion bottle marked for drachms; add distilled water, and allow to soak. When swelled pour off the non-absorbed water, and add distilled water up to the four-drachm mark. Dissolve the gelatine by placing the bottle in heat. When quite dissolved divide into two portions; to one add the bromide salts and to the other the silver. The cadmium will probably render the gelatine somewhat opaque, but this is of no consequence. Place the bottles in heat, and at the same time warm the pyro. and gallic acid solution (if an aqueous one) to dissolve the deposited salts. If an alcoholic solution be used this will not be necessary. When the bromide salts, the silver, and gallic acid are all dissolved add the bromide to the silver solution by degrees, shaking well between each addition, and when all is mixed add either of the pyro. and gallic acid solutions (B), shake well, and add warm distilled water to make up the bulk to two ounces. Put the emulsion in some dark place for twenty-four or forty-eight hours; I prefer the latter time. This thin emulsion will remain in a liquid state when cold, thus allowing the silver to act fully on the bromide.

Next, take the remainder of the gelatine, twenty-six grains. Place in a bottle with distilled water, soak, swell, and pour off non-absorbed water; then add the aqueous decoction of catechu (C), and place the bottle in heat to dissolve the gelatine. If the alcoholic tincture be used it will be better to add it after the gelatine is dissolved.

When the thin emulsion has stood the required time it is to be warmed and the thick solution of gelatine melted. The thin emulsion is then (after gentle shaking) filtered into the bottle containing the thick gelatine, and the whole well mixed. It is then, after half-an-hour, poured out to set. When quite firm it is cut across in strips about an inch wide with a bone or ivory paper knife, and again at right angles at the same distance; the surface is covered with water for a few minutes, which is poured off, and the emulsion removed and washed in any manner the operator thinks fit. I use for this purpose a glass marmalade jar with a lid, in which the emulsion is allowed to soak for twenty-four or thirty-six hours, changing the water six or eight times during that period, which is easily done by placing on the lid and gently inverting the jar. When washed remove into a wide-mouthed, three or four-ounce bottle. All water is drained off, and the emulsion melted. If necessary, distilled water may be added to make up the emulsion to two ounces.

Coating and Drying.—On these subjects I need not enter, as they have been well described by others, but may add a caution not to leave *too thick* a film on the plate, as the emulsion gives density without the help of a thick film.

Exposure.—In a dull light, during the winter, with a Ross's single stereo. landscape lens I have found an exposure of four minutes sufficient to render details in the shadows. Of course in a bright light and with a quicker-acting lens less time would be required.

The following are the developing solutions:—

P.

Pyrogallic acid	24 grains.
Alcohol	1 ounce.

B.

Bromide of potassium	22 grains.
Distilled water	1 ounce.

A.

Strong ammonia	1 drachm.
Bromide of silver	*quant. suff.*
Distilled water	1 ounce.

Add any quantity of silver bromide to the ammonia; after an hour add the water and leave the excess of bromide in the bottle for future use.

Development.—The exposed plate is placed in water whilst the following is mixed:—

C.

Solution P	10 drops.
Distilled water	1 ounce.

For a quarter-size plate take of solution B two drops, solution A two drops, and add four drachms of C. Mix.

The plate, being removed from the water, is slightly drained and placed on a stand, and the mixed developer applied, pouring off and on once or twice to remove any adherent water, and allow the developer to act more evenly and freely. The picture will begin to appear in from fifteen to thirty seconds and proceed steadily if the exposure has been properly timed. As soon as the developer shows the *least* sign of being discoloured it should be thrown off, the plate washed, and a fresh mixture applied. This process is repeated until all details are out in the shadows, or the picture by reflected light begins to disappear. It is then washed under a tap and allowed to dry. When dry it is fixed in hypo., well washed, and allowed to dry spontaneously. I prefer giving a very full exposure to obtain soft pictures.

If any of your readers are tempted to try this process I do not think they will have reason to complain of insufficient density.

F. S. K.

SEASONABLE HINTS TO YOUNG LANDSCAPISTS.

LANDSCAPE photographers are sometimes tempted to wish that their lines had been cast in latitudes where the "merry sunshine" smiles upon their labours all the year round; but, however it may be with the professional photographer, I am quite sure that to the amateur the constant recurring change of season, which is one of the greatest charms of our country, gives an impetus and zest that in its absence would be altogether wanting. It has often been said—with what amount of truth I am not quite certain—that in the department of landscape photography we are considerably ahead of our apparently more favoured brethren; but if this should really be the case it is, I venture to think, a strong argument in favour of my proposition. Be this as it may, the wheel of time has again revolved so as to bring the season for out-door work within an easy distance, and with the advent of longer days and improved light photographers will soon be busy overhauling cameras, refilling bottles, and exercising their minds in the attempt to decide as to the process which they shall adopt for the work of the season.

In the exercise of this choice they are limited to three types or varieties—dry plates by the emulsion process, dry plates sensitised in the bath, and wet collodion. For some time at least the emulsion processes have, to a large extent, monopolised the attention both of writers and experimentalists, and they have, doubtless, been thereby brought to a high degree of perfection; but as each of the three

varieties possesses special features which render it best suited for special work, I should be sorry to see any one of them unduly neglected. The convenience and comfort in working dry plates will, doubtless, always give them a preference for the amateur, more especially as when the conditions are thoroughly understood and properly carried out they can be made to yield negatives in every respect equal to the very best results of wet collodion. Although, however, I say that negatives of the very highest class *can* be made from dry collodion or gelatine plates, I do not by any means wish it to be understood that such results are the rule; indeed, an examination of the negatives of a pretty considerable number of experienced dry-plate workers rather leads me to think that it is the exception.

So far as my experience goes I am warranted in saying that in probably nine cases out of ten such an examinatson will show that, although the negatives from dry plates may be of very fine quality and worthy of much admiration, when we come across a wet collodion negative amongst them it is found to possess a subtle something which at once impresses the mind with the knowledge that it will give a print more brilliant, softer, and "juicier" than any of the others. The fact would seem to be that the conditions under which the very highest degree of success can be attained with dry plates are much more difficult to comprehend and carry out than is the case with wet collodion, and, therefore, on that account, as well as in virtue of its more suitableness for certain special purposes, it is not likely to be soon altogether abandoned even by amateurs.

That being so, it becomes a matter of some importance to inquire how best the admitted difficulties and inconveniences of wet collodion may be avoided. Of tents, cameras, and apparatus generally I have not a word to say, as most manufacturers now offer a choice of articles as nearly perfect as can be looked for. Neither have I anything to suggest really new in the way of manipulation or chemicals; but I think a few hints culled from the experience of others may not be unseasonable, especially to those who may be but on the threshold of wet landscape work.

One of the greatest sources of annoyance in certain localities is the large quantity of dust floating in the atmosphere, which finds its way into the slide and from thence to the plate, forming pinholes of all sorts and sizes, and often ruining otherwise faultless negatives. The liberal use of a moist sponge will be found a perfect cure for this trouble. The whole of the inside of the camera should be kept damp, and the slide thoroughly sponged immediately before each plate is inserted. This is easily done, and I am convinced from my own experience that whoever gives the method a trial will not readily give up the practice.

The free use of blotting-paper is another element essential to success. The first two or three plates of a day's work are generally all right, but by-and-by certain markings begin to make their appearance on the lower (sky) part of the plate, and if the remedy be not applied it soon gets so bad as to put an end to work. The remedy is simple. Strips of blotting-paper laid along the bottom of the slide on which the plate may rest, so as to absorb the solution which drains from the surface, will effectually prevent the evil. A pad of three or four sheets of moist blotting-paper should also be laid on the back of the plate, especially when the camera is at a considerable distance from the tent, or when the temperature is high. In this manner in the hottest summer weather a plate may be kept for a much longer time between sensitising and developing than is generally supposed. There is one precaution, however, that must not be forgotten, that is to see that the plate is well drained before it is put into the slide—not merely till it ceases to drop, but till the solution ceases to accumulate at the lower edge. In ordinary temperatures five minutes spent in this operation will usually be found of great advantage.

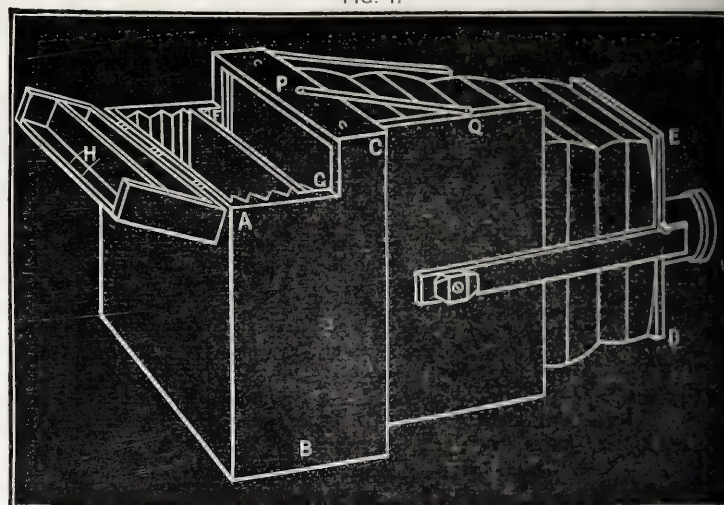
Wet collodion, as generally worked, includes both developing and intensifying, but I believe most experienced workers save both time and water by merely developing in the field, washing with a very little water, and finishing the operation in the comfort of the operating-room at home. For this purpose the partially-developed negative must be kept moist, and in my experience nothing answers so well as a weak solution of treacle or "golden syrup." But although, as generally worked, wet collodion implies redevelopment or intensification there is no real necessity for such being the case. When the bath is in good condition and not quite new, and the collodion ripe or, better still, a little aged, a trace of suitable organic matter in the developer will, when a proper exposure has been obtained, always give sufficient intensity by a first application. For this purpose nothing can be better than the altered gelatine proposed by Mr. M. Carey Lea, and for the preparation of which a formula was published in these columns recently. I have been experimenting with it, and can strongly recommend it to the attention of all who work wet collodion. John Nicol, Ph.D.

DRY-PLATE CAMERA.

It may, perhaps, interest some of your readers to see a sketch of a camera I made for myself two or three years ago, and have used with much comfort.

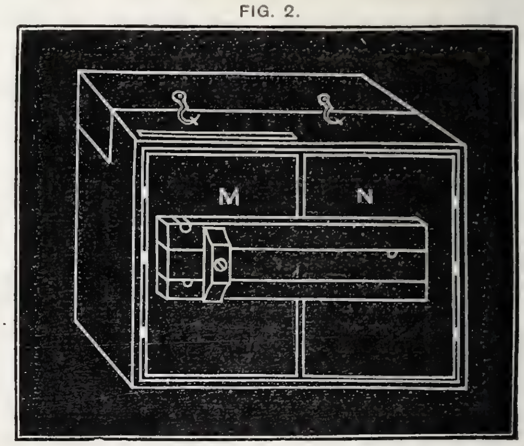
It consists of a box A B C. The back part A B is a plate box. The other part B C carries a conical bellows body and front D E for the lens.

FIG. 1.



The plate to be exposed is transferred (in a black bag) from its groove into its place F G, where it is pressed against the rebate by a wedge at the bottom and a spring or piece of india-rubber in the lid at H. The front of the camera is closed by two doors (*fig.* 2, M N),

FIG. 2.



Size $9\frac{1}{2} \times 7\frac{1}{2} \times 4$, for plates $8\frac{1}{2} \times 6\frac{1}{2}$. Weight 2 lbs. 12 oz.

which are crossed by three bars—two fixed to N, and the middle one to M. When the doors are open these bars project, and the front of the bellows body, when drawn out, is hung upon them by two catches on one side and one on the other. The front for holding the lens is double, and a small plate of brass slips in between the two parts, so as to close the aperture until the lens is screwed on and capped. One of the doors is clamped in position by a brass bar P Q. For greater clearness in the sketch I have omitted the rebated edge of the lid of the box by which light is excluded from the plates.

From the simple form of the camera it will be seen that it requires no screws, and may, therefore, be made of deal. Mine weighs only $2\frac{3}{4}$ lbs., and will hold six plates—enough for a day's work. The size, when closed, is $9\frac{1}{2} \times 7\frac{1}{2} \times 4$ inches for plates $8\frac{1}{2} \times 6\frac{1}{2}$. T. H.

COLLODIO-BROMIDE PROCESS.

At the last meeting of the Photographic Society of Great Britain Mr. William F. Henry read a short paper in which he described his method of preparing emulsion plates. He said:—By the kindness of Herr Warnerke in furnishing me with his formula for a bromide-of-zinc emulsion I have been enabled to make some experiments

in the direction of simple washed dry plates; and, so far, my experience informs me the zinc emulsion promises to give the most rapid and in every way most satisfactory collodion dry plate, the only point yet remaining to be ascertained being its keeping qualities.

The formula given to me was, for one ounce of emulsion:—

Nitrate of silver	17 grains.
Bromide of zinc	$9\frac{3}{4}$ „
Aqua regia	$2\frac{1}{3}$ minims.

By multiplying these amounts we arrive at more workable quantities. Herr Warnerke directed me to add the silver to the collodion first, and allow it to stand for twelve hours or so. But I have found no advantage in this; on the contrary, it is easier to emulsify when the collodion is bromised first. And here I would observe to amateurs like myself, the surest way of getting all the silver into the emulsion is to dissolve it in a clean bottle by the aid of heat, and then pour in the bromised collodion; the act of pouring in thoroughly emulsifies the mixture without the necessity of violent agitation. This emulsion requires to stand for a week or ten days before being used, for the reason that before that time it gives only a thin film, but after the lapse of that time it acquires a very thick and creamy consistency and is more sensitive.

The zinc being easily soluble in alcohol there is no difficulty either in keeping it or in mixing. I have found with this formula a strong disposition to fog, which condition, though balanced by the density afforded by the zinc, is not desirable; this is corrected by the addition of iodine.

Plates made in this way need neither organifier nor redevelopment to confer density, as may be seen by examining the specimens sent round, which were taken by three seconds' exposure to a gas flame. I have succeeded, as Herr Warnerke and Mr. Nesbit know, in obtaining a thoroughly-exposed transparency in one second.

FOREIGN NOTES AND NEWS.

Retouching of Carbon Prints on Glass.—A New German Photographic Journal.—Decoration Conferred upon a Photographer.—Dr. Stein's Application of Photography to the Tideometer.—The Illustration in the *Correspondenz*.

As most persons who dabble in carbon printing to any extent are aware, pictures in pigments are usually retouched before the final transfer to paper, as the glossy surface of the collodion film does not absorb the colouring matter. In an article, in the current number of the *Photographische Correspondenz*, on the retouching of pigment pictures upon glass, Dr. Schnauss says that on various grounds he has rejected the usual retouching materials, such as oil colours, lead pencils, the so-called albumen colours, &c., and suggests a substitute upon which experience has induced him to place great reliance. This idea—which seems simple, practicable, and economical—is simply to retouch with pigmented gelatine obtained by dissolving prepared tissue in warm water, and picking out the paper as soon as the coloured gelatine has floated off it. Economically-disposed persons will find this a "happy thought" for utilising parings of tissue which would otherwise be thrown aside as useless.

The whole stock-in-trade of Dr. Schnauss's retoucher consists of an ordinary retouching desk, a water bath, a gas or spirit lamp, a small tin or copper kettle having three circular holes punched in its lid to admit of the insertion of three small porcelain saucers, the said three saucers, and some fine brushes. He fills his kettle with hot water and sets it over the lamp to keep it hot. In one of the saucers he puts a thick solution of the pigmented gelatine, another he fills with clean hot water, and in the third he thins down the coloured gelatine to the required consistency with a sable pencil dipped in the hot water of saucer number two. The colour should be quickly applied to the picture, as when it is thick it is apt to cool rapidly in the course of the operation, and thus become too thick and stiff to be worked with pleasantly. Should the pigment be applied too thickly in retouching to any particular spot the superfluity may be removed by a pencil dipped in hot water; but this requires care. The pictures may be retouched on an ordinary retouching desk, and, should they not already be upon opal glass, progress may be ascertained from time to time by placing a piece of white paper under the glass at some distance from it and shutting out all side lights. When the retouching is finished the print should again be fixed before being transferred to the mount.

Dr. Schnauss, though he thinks the foregoing method might easily be applied to colouring portraits, fears it would be inferior to oil colours for that purpose, and only recommends it as excellently adapted for retouching, in the usually-accepted sense of mending flaws in the film or modelling.

We understand that the new photographic society of Frankfort-on-Maine, the reports of whose meetings have hitherto been published in the *Mittheilungen*, intends to start an organ of its own. The projected newspaper, which will be edited by Dr. Schleussner, who has until now furnished the reports of the Society's proceedings to the *Mittheilungen*, will increase the number of photographic journals printed in German to seven, two of which are published in Austria, four in Germany, and one in Switzerland.

The Emperor of Austria has conferred the Knights' Cross of the Order of Francis Joseph upon Herr Otto Schofft, who is a member of the Vienna Photographic Society, and is presumably a photographer, either professional or amateur.

Dr. Stein, of Frankfort-on-Maine, whose method of automatic registration by means of photography of the pulse-curve as rendered by the sphygmograph was recently published in our columns, has applied the same principle to a self-acting apparatus for recording the various heights of the tidal wave at different points on the coast line. It consists of a tideometer of the usual description fitted in addition with a clockwork arrangement which gives motion to a band of sensitive paper, upon which falls a ray of light passing through a small aperture that rises and falls with the tide, forming a continuous line upon the sensitive paper.

This month's number of the *Photographische Correspondenz* contains a very interesting portrait of Lucas Vorsterman, of Antwerp, reduced and faithfully reproduced in the heliographic manner in the *atelier* of Herr Zamarski, of Vienna, by Herr A. Franz, from an etching by Vandyck.

THE THREE PORTRAITS.*

Opening the case she took out one of the portraits, and, holding it in her hand, still without looking, she continued—

"This poor boy's nurse lost this brooch and picture when she was out walking, and, whilst she grieved for the loss, a worthless one picked it up and left it at the broker's for a few coppers, and these she consumed in liquid ruin. And now I will tell you some of the incidents in the life of

"The Sailor Boy.

"'The sea—the glorious, beautiful sea—on whose heaving breast richly-laden vessels speed on to all parts of the world, from the cold, bitter north to the sunny south, from the land of ice-bound verdure to those climes where the brilliant flowers dance wantonly in the genial sun to the tune of soft breezes from the sea! Your lisping, murmuring, splashing tide is such music in mine ears that it makes the blood leap in my veins with very joy. No! no! life is no life to me unless I live it on the sea.'

"So mused Frank Hallady, the pretty blue-eyed boy with the open, generous face, as he gazed wistfully out upon the glittering, silvery-tipped waves, as in the merriest of moods they danced in the summer sun. Poor boy! no thought of that *other* sea—that grumbling, growling, angry sea, on whose tempest-tossed breast the foam rushes white with fury; where richly-laden vessels freighted with human souls are dashed to pieces in the angry play of these very waves; and where the poor souls in the midnight, wrestling with death, look up to the stormy sky with a shriek and sink to rise no more, one after another, down, down, to eternity. The widowed mothers, childless, sit and wail over their boys who went down to the sea in ships—for ever lost, never to return again, their soulless bodies in their shifting graves midst the tangled weed and coral reefs—lost to their mothers for ever! As they sit and wail the refrain is ever—'Oh! the treacherous, treacherous sea!'

"Frank knows not this side of the picture. How should he? His young life has been one continuous pleasant day—no shadow, but all sunshine; and still he sighs as he gazes—'Life is no life at all to me unless I live it on the free, the open sea.'

"'And so, Frank, your father and mother have at last consented to let you go away?' This was said to Frank Hallady by the old woman who had been his nurse, and who had a regard for him next to his own mother.

"'Yes, Jenny,' Frank replied, gleefully. 'Is'nt it jolly! Mother was rather cut up at first, you know, but she's all right now—and father says that a wilful man (I'm the man, Jenny) must have his way.'

"'Oh! laddie, laddie, if you only knew what a sair heart it would give your mother, I believe you would settle down at home yet.' And the tears stood in the old woman's eyes as she sat gauging the mother's trouble by the void it would leave in her own heart.

"'Now, look here, Jenny! Don't preach, there's a good soul!' Frank exclaimed, with a laugh. Patting her on the cheek, and pulling a little parcel out of his coat pocket, he continued—'But just look here at what I have brought you,' and he handed her this brooch and picture. As the old woman looked at it she exclaimed—'My gracious, laddie! What made

* Continued from page 105.

you go and waste so much money on me?' As she shaded the picture with her hand, so as to get a better view of her darling's face, she sat for a little and cried. Then she said—'Oh, Frank! but it's awfully like you. And oh! it was so nice of you to mind me at such a time when all your friends are crowding round you.'

"'Why, nurse, I could as soon forget myself as you.' Then Frank got soft and the tears would come, so he threw his young soft arms around her neck, and his lips, as full and soft as rosebuds, were pressed so fondly to hers, hard-lined and dry with age; and thus they enjoyed a good cry together.

"After many advices and farewells he had at length to go. As he was moving towards the door he said in a cheery voice—'Keep your heart up till I return, and see if I don't bring you the finest shawl to be had in all India!' As he passed out of the doorway a shadow descended on old Jenny's life never to be lifted again.

"The room looked bright and cheery. Father and mother and Frank sit at their tea. It is Frank's last night at home, and each tries to have a happy, pleased expression—the thin mask hiding a heavy heart. Thoughts are weighty and conversation is slow, though time is short. Frank's father, in a lively voice, has been laying down some of the points in a life which conduce to success; and his mother looks on with her quiet, gentle smile, which has so often covered an aching heart.

"'And you will never lose an opportunity of writing home, Frank dear, for father and I will long so much to hear from you,' Mrs. Hallady said.

"'Never fear, mother darling. I will keep you posted up in my latitude and longitude. You shall have a correct copy of my observations;' and he tried to laugh, but it wasn't a success.

"The time was drawing near for parting, and a stray tear every now and then would well up into his eye. He would brush it away as if it were a fly, and continue the conversation to drown the parting pain.

"'And, dad, I will bring you a box of cigars such as you never saw before.'

"'Thank you, Frank. I suppose you will pay duty to the customs as well as to your father?'

"'Fie! fie! dad. You didn't dream I could smuggle them, did you?—and, mother! I will bring you, well—no end of things.'

"'But where are you to get the money to redeem your many promises?' his mother asked with a smile.

"'Work for it, of course,' he said, drawing himself up to his full height and looking important.

"'That's right, lad,' said his father, affectionately patting him on the shoulder—'Work for it, Frank. Always work for it, and there's no fear of you.'

"And so in family converse the night sped on. The morrow came, and with it the parting.

"The father and mother stand upon the shore and see the vessel moving away—slowly, surely, away—until it looks no bigger than a man's hand. All that they hold dear in life floats away in that little speck. They offer up a united prayer to God for the boy's safety. The speck has gone, so with heavy hearts and moistened eyes they return to their now empty home.

"Away over the broad expanse of water for weeks the vessel danced on its way, and Frank was as buoyant as his swift-moving home. After his first sickness was over, which lasted for a few days, he was the most joyous and happy soul on board. His youthful daring and his free, open temperament won him at once the good will and whole hearts of the men. Ever willing and ready to lend a helping hand, whether it was his duty or not, and the manly way in which it was done, soon earned for him the title of 'little gentleman Frank.' Even by the officers he was treated with much more consideration than is usual; his training and education, joined to his intense faculty for loving any and all of God's creatures, endeared him alike to officers and men. Alas! his life was but a ray of sunshine obliterated by a shower.

"The night was very calm, and Frank lay on the deck dreaming of home. He could see his father sitting by the fire with his paper and pipe—he knew that he was reading 'Shipping Notes' and thinking of his boy. He could see his mother in her old arm chair with the companion of her leisure hours, her stocking—the click, click of the wires keeping time to her fast-running thoughts; and surely she thinks of her boy! A soft joy spreads over his face as he wafts them home a 'God bless you, both!'

"'The sea's the place for fancies, Frank,' said the mate, who had been standing looking at the youngster's glowing eye and cheek.

"'Yes, Mr. Ben,' Frank said, starting up, 'I was thinking of home.'

"'You get away down to your hammock, lad, and have a rest. We are likely to have dirty weather soon. The barometer has fallen remarkably.'

"'All right,' Frank said, with a laugh, as he prepared to descend to his bunk; 'but much use I'd be in a storm!'

"'You never know till you try, and I know it won't be for want of trying if you are no use,' and with the encouraging, cheery voice ringing in his ears he tumbled into his hammock, just as he was, in case of need. As he lay there between waking and sleeping a strange feeling took possession of him—a presentiment of evil weighed heavy at his heart.

"'I suppose it's the state of the weather,' he said to himself, as he tried to dispel the black fancies. Turning restlessly in his bed he fell into a troubled sleep. Again he dreamed of home, but it was not the home of his sunlit day dream. Blackness and darkness and death seemed there. He saw his poor mother lying pale and helpless. He saw his father bending over her, haggard and wasted. He started up in terror and peered into the darkness. It took him a little time to remember where he was. A storm was raging; the winds were howling, and the waves lashing against the vessel's sides. For a moment he was heedless of them, and the boyish prayer from the troubled heart arose in thanks to God that it was but a dream. As he pressed his hands to his eyes he muttered—'But such a horrible, horrible dream!' Now he becomes conscious of the sound of eager voices and hastening footsteps heard between the gusts of wind, which in its howling drowns all other sounds. The lashing of waves and the creaking of timbers is all around him. In a moment he is himself. Quick as thought he springs from his hammock and rushes on deck.

"'My God, boy! Go down!' exclaimed an old man who was holding on for bare life to the rigging. He loved the lad as if he had been his own son. 'Go down, I say,' he cried in agony. 'You can never face a storm like this.'

"'Why, Boxer, do you fancy I'm going to shirk my duty now?' and he grasped the old man's arm to stay himself as he staggered about trying to distinguish objects in the darkness. 'See! see!' he continued earnestly; 'Jones is sure to go if some one does not help him with that sail!'

"'Now, Frank, as you love your life,' the old man said, almost in tears, 'stay here with me!' It was useless. He sprung from the old man's side and reached the ladder. One, two, three steps! Heavens! he seems to lose his presence of mind! Or is the wind too strong for him? He wavers for a moment, and, like the withered leaf from the naked branch of a tree, he is whirled away into black night—into eternity! A scream from the old man, which dies on the wind, a cry of agony from the child, which is heard high as heaven—one moment he struggles with grim death. Lashed by the waves into insensibility he sinks to rise no more.

"And so thus dear little Frank found his grave in the beautiful sea."

(To be continued.) MARK OUTE.

NOTES FOR A SHORT TOUR IN BELGIUM WITH THE CAMERA.*

LEAVING St. Jacques, and returning by the Longue Rue Neuve, there is a private mansion, which was once the residence of the Duke of Burgundy. On application to the present proprietress a sight is obtained of the richly-decorated private chapel, with its stained-glass windows and walls, emblazoned in colour with the family genealogical tree of the above illustrious nobleman, the branches being hung with shields of arms intermixed with birds in a very beautiful and fanciful manner. The richly-groined ceiling is also decorated in colour in the most exquisite taste. Between this and the cathedral, in a quiet square, is the Church of the Jesuits, built in the style of the Italian *renaissance*, with some good points in the interior. But no Scotchman should leave Antwerp without seeing the Church of St. Andrew. The elaborately-carved oak pulpit represents the call of the Apostle, who, with his companions, all life-size, are standing in a boat in which the cordage of the nets and fishes are all carefully worked. Altogether it is a most wonderful piece of sculpture; and on one of the pillars near it is hung an original portrait of Mary Stuart, the ill-fated Queen of Scotland, said to have been presented to the church by one of the three Maries, her maids of honour.

For a little change we take a day to Lierre, which is only twenty minutes' distance by rail. The principal object there is the Church of St. Goemaere, the interior of which is particularly fine, the rood-screen itself being well worth a long day's journey to see, its black marble shafts and foliated arches looking like petrified lace, being so richly and delicately carved. Three or four excellent pictures can be got here, and also some picturesque "bits" in the town.

Before leaving Antwerp we must take one day at the Musee, or picture gallery, as it is one of the principal attractions of the town. It contains some of the finest works of Rubens, Vandyke, Jordaens, Snyders, and a host of others of the most celebrated Flemish and Dutch painters. In the vestibule or staircase is a series of paintings by Baron de Keyser, representing the progress of the fine arts in Belgium. These are of colossal size, and, with all the elegance of design and correctness of drawing of the best of the old masters, they possess that further charm of colour belonging to the best period of the Flemish school, and will stand comparison with any work of modern times, French or German; in fact, they are well worth a journey from Edinburgh to see of themselves. Besides these there are several private galleries worthy of a visit.

Having completed our work at Antwerp we shall proceed to Brussels, which is only an hour's journey. From the station to the Rue Neuve is but a short distance, where we shall find comfortable quarters, at a reasonable cost, in the Hotel l'Univers.

* Concluded from page 242.

So much of the old part of Brussels has been pulled down lately that the most picturesque parts are gone and replaced by handsome modern buildings, which, although fine in themselves, are not good subjects for the camera, if we except the new Bourse, in the Italian style, which is very fine. We have, however, some noble specimens of the old Flemish architecture in the buildings in the Grand Place, and, beside these, the magnificent Town Hall; then there is the exterior and interior of the cathedral, both of which are fine. The west front, being so much elevated above the adjoining ground, has a most imposing effect, and is well worthy of a close inspection. There are also some of the public fountains and monuments that will make good pictures. Taking Brussels as a whole, although a magnificent city, it has far fewer picturesque objects than the old town of Bruges; yet there is much to gratify the stranger in the noble streets and boulevards, with the drive to the Forest of Soigny. The interior of the Palace is also worthy of a visit, as well as the picture galleries, including the Wiertz Museum.

Close to Brussels is Louvain, which will well repay a day's visit. First, there is one of the largest and finest of town halls, and, next, the interior of the Church of St. Gertrude, and some other objects, all of which could be easily accomplished within the day, returning to Brussels in the evening.

Hitherto our movements have all been in a forward direction. Now we must begin to retrace our steps homewards, and our first move will be to Courtrai; but this, with some of the neighbouring towns, we must leave to a future opportunity.

If your time permitted it would give me great pleasure to tell you of the many acts of kindness I have received at the hands of the people during my wanderings among them, and the ready permission I always met with when asking admittance to see the interiors of some of the buildings, both public and private, where I knew there was something of interest to be met with. I have often been ashamed of myself on account of the great trouble they took to accommodate me, in permitting me to sketch or photograph things that I desired, so that all my remembrances of Belgium are of the most pleasant description.

John Lessels.

Our Editorial Table.

The Micrographic Dictionary.

London: John van Voorst.

The third edition of this standard work bears in many respects a marked advance upon the two previous editions; but as this work is now for the first time brought before our readers through the agency of "Our Editorial Table," we shall notice the work *de novo* rather than by way of comparison with former editions.

The *Dictionary* is in two volumes, one being composed of descriptive matter, the other of illustrations. In the "Introduction" to the text we have a comprehensive treatise on the microscope as an instrument of research and investigation. This sub-treatise contains not only a plain and very full account of the numerous accessories which conduce to render the instrument perfect, but also hints on the best methods of using such accessories. These are given under the heading "Use of the Microscope and Examination of Microscopic Objects." A second branch of the "Introduction" is devoted to the determination of the structure of microscopic objects from the appearances they present under various conditions—both of these being essays of great importance.

The article on the angular aperture of object-glasses possesses much value, and is one of the most discriminative in the book. The term has a nearly similar signification in its application to photographic lenses as to microscopic objectives, being the relation existing between aperture and focus. But the uses are widely different; for, whereas in the former the value of a large angular aperture is found in its power of transmitting a very large number of rays, quite irrespective of obliquity of transmission, so as to secure by a large volume of light great rapidity of action, the value of this property in the microscopic objective consists in its permitting the transmission of a small portion of light at a great degree of obliquity. But the microscopic tyro may inquire—"What use is subserved by looking at an object through which the light is projected obliquely?" Simply this, we say in reply: structures of extreme fineness *cannot* be seen unless by obliquely-transmitted light; and, again, unless an objective have a large angular aperture it cannot receive and transmit to the eye those rays which render such structures visible. A large angular aperture is, therefore, a *sine quâ non* in an object-glass to be used for defining such markings as the valve of a *Pleurosigma* (and here let us remark that for some reason which does not appear the authors of the *Micrographic Dictionary* prefer to adopt the term "*Gyrosigma*" for the more popular synonym). Many, especially at the present time, affect to contemn objectives having large apertures, on account of their alleged fitness for only one of several qualifications an object-glass should possess, namely, definition; and such microscopists take pleasure in asserting, what we quite admit to be correct, that with a large aperture there is no depth of definition. This is a fact that is known to none so well as to photographers, who have a series of diaphragms adapted to each of their lenses, so as to procure the requisite depth when the aggregation of the subject to be examined is such as to necessitate their being all seen with a sufficient degree of definition to show their leading characteristics, although they may occupy planes varying in distance from the objective. It appears strange to us why the fact is not more recognised by microscopists that their objectives are amenable to the same influences as those of the photographer. The authors of the *Dictionary* seem well aware of this, and hence they distinguish between "penetration" and "definition," and their observations on this point we most heartily endorse.

The numerous engravings in the plates which form the second part, or volume, of the *Micrographic Dictionary* are exceedingly well executed. This is, in an especial degree, the case with plate 1, which is devoted to "test objects," the markings on which are so well drawn that after looking at them for a short time through a magnifying glass we have had a difficulty in realising the fact that we were, after all, only looking at an engraving.

Among the names of the contributors to this valuable work of reference for the microscopist and man of science we find those of Messrs. M. J. Berkeley, Westwood, Dallas, Tuffen West, Rupert Jones, and others equally well known to our readers. The list of subjects embraced is very complete, but at present we shall abstain from noticing them, reserving them for an early future occasion, when we shall give our readers one or more extracts from what is without doubt the most perfect work of reference connected with the microscope that has yet issued from the press.

We may state, in conclusion, that while the former editions were edited by Dr. Griffiths and Professor Arthur Henfrey, of King's College (the latter being the first editor of the *Journal of the Photographic Society*), the present edition has been issued without the aid of the latter gentleman, whose death was recorded in our pages some time since. Dr. Griffiths, however, has in Professors Martin and Jones and Mr. M. J. Berkeley assistants whose names are a guarantee as to the value of the work.

Meetings of Societies.

LIVERPOOL AMATEUR PHOTOGRAPHIC ASSOCIATION.

The monthly meeting of this Association was held on Tuesday evening, the 28th inst., at the Free Public Library,—the President, Mr. W. Atkins, in the chair.

The minutes of the previous meeting were read and passed.

Mr. J. H. T. Ellerbeck's proposal was adopted—"That a collection of lantern slides presented by the members should be made by the Association, the members to have the use of the same on application to the Secretary."

The Rev H. J. Palmer exhibited a number of negatives prepared by dissolving Kennett's pellicle in mild beer instead of water. The negatives were of various sizes, from quarter-plate to 7 × 9. All the negatives were of sufficient density, which had been obtained without any after-intensification. Mr. Palmer also exhibited a large group on a 7 × 9 pellicle plate, prepared with water a year ago, and which had kept well; the exposure was fifteen seconds, Ross's landscape doublet, no sun. Mr. Palmer, in his remarks relative to the gelatino-beer pellicle, stated that though the pellicle dissolved more slowly in the beer yet the plates dried more quickly. The emulsion acted more like collodion in flowing easily over the plate, so that large plates could be coated without using a glass rod. These plates were rather slower, but there was more freedom from fog, and more light could therefore be used in the dark room. He (Mr. Palmer) was not sure but that for interior work the pellicle dissolved in water would be preferable, but for outdoor work he certainly preferred that prepared with beer. He had tried to make pellicle with beer but failed, owing to the silver being thrown down on adding the beer.

Mr. E. Roberts thought this might be owing to the presence of salt, which was found in some kinds of beer.

The Secretary showed a number of prints from gelatino-beer plates, and stated that he found no difficulty in getting any density without after-intensification. There was also more latitude in exposure. He passed round a print which he had taken with an exposure of a minute, with the smallest stop, in so dull a light that with any other process he would not have cared to expose a plate at all. It would be seen that all detail was visible. For outdoor work the addition of beer was an improvement.

Mr. W. H. Kirkby exhibited some Liverpool plates which he had sent out to the Cape of Good Hope to be exposed. They were developed when he received them back twelve months after exposure, and were satisfactory. He also exhibited a portrait taken instantaneously on a wet emulsion plate by the light of one of Mr. W. Keith's lighting powders.

The following were passed round for inspection, with thanks to the donors:—The last number of the *Bulletin Belge; Aide-Memoire de Photographie* for 1876, by M. C. Fabre, of Toulouse; and the *Agenda Photographique* from M. Leon Vidal.

The meeting was shortly afterwards adjourned.

Correspondence.

FURTHER EXPERIMENTS WITH THE CHLORIODO-BROMIDE PROCESS.

To the Editors.

Gentlemen,—I have still no account to give but that of failures of the chloriodo-bromide process. Let me here say, before commencing my mournful tale, that what I write and have written about the process is only intended to apply to the process in *my* hands, and not to the process as a process.

In my last communication I stated my conviction that the pyroxyline I had used was unsuitable, but that it had been made by Mr. J. W. Gough's formula. This latter statement is incorrect, as *gelatine* was substituted for the isinglass; thus the formula was a modification of Mr. Gough's and Colonel Stuart Wortley's. Colonel Wortley considers that the use of nitrate of potash instead of nitric acid would be quite sufficient to account for any failure in making a good pyroxyline, and he very kindly supplied me with two varieties of "gelatine pyroxyline" as made by himself. I then thought that my troubles were at an end, and that only success could be before me; but these hopes proved utterly vain, as I will proceed to relate.

Sufficient "salted" collodion was made from both the pyroxylines—numbered respectively "118" and "119" by Colonel Wortley—to make six ounces of emulsion for each sort, and the two collodions were then placed in the light, and often "sunned," for a week, at which time "118" was made into emulsion, using twenty-five grains to the ounce of fused nitrate of silver. Half of this, when well set, was organified with the usual albumen, &c., and to the other half was added twenty minims per ounce of glycocine made by the formula given some two years ago by Colonel Wortley in the directions for developing the uranium plates; but this latter emulsion was rendered useless by, as I presume, the addition of too much water, for the silver salts were largely precipitated and did not seem disposed to re-emulsify. The pyroxyline was not precipitated, as proved by its giving a tough film on pouring out to set. After washing and drying this "emulsion" refused to emulsify, the silver salt going to the bottom of the bottle. The three ounces organified with albumen, &c., gave a pellicle which formed a good emulsion; but the latter proved exceedingly insensitive, requiring about double as long as wet collodion to obtain even the *slightest trace of a shadow* under a negative. I should mention that thirty minims per ounce of glycerine were added to the emulsion, and the resulting pellicle weighed about the same as that Mr. M. Carey Lea describes. A plate coated with the finished emulsion showed some signs of cracking at the edges; but in this respect there was a great improvement on the former emulsions.

A week after making this emulsion I experimented on collodion "119," which had been kept in the dark since the making of emulsion "118." The pyroxyline (made with *papier Joseph,* as also the other) seemed to be rather less powdery than the "118" sample. After having been sensitised eighteen hours ten minims per ounce of the glycocine solution were added, and a plate coated and washed. The rest was poured out to set, and was then washed and dried at about 100° Fah. The resulting pellicle weighs as nearly as possible as much as Mr. Lea's. The pellicle dissolved gives a film which strips and breaks up on the india-rubber-edged glass as soon as it is completely dry. Thus here is a failure with "Wortley pyroxyline" exactly like that with my own make. A gelatine substratum does not much improve matters; and some plain collodion was added to the dissolved pellicle with a like result. I have exposed the plate coated before pouring the emulsion out to set, as well as a pellicle plate, and find that the former is as insensitive as the former pellicle emulsion, and the latter gave no trace of an image, but was more liable to fog than the former. The collodion in this case seems to be unsuitable; whether it has not been salted long enough I do not know. But still, with the apparently more suitable collodion mentioned above, the plates proved exceedingly insensitive. Thus I cannot account for my failures with this process. I do not think my washing water can be the cause of insensitiveness, as I have never had occasion to find fault with it before. It is rain water kept in a closed barrel, to which I occasionally add a little of a solution of permanganate of potash. This water passes through a charcoal filter before using, and I believe it to be free from any deleterious agent. Can anyone suggest a possible cause of these failures? I cannot think that want of age of the collodion could of itself be sufficient to cause so complete disasters.

I note in the "correspondence" column a doubt expressed by "Tyro.," Manchester, as to the remark of a correspondent—presumably myself—"who gave a Kennett plate an exposure of half-a-minute to the light of a paraffine lamp." This is no misprint; though, of course, paraffine lamps give varying intensities of light. The flame of my lamp is, I think, of a medium size. I find a "Liverpool" emulsion plate requires five minutes' exposure to the same light; and by this *data* the Kennett plate is ten times more sensitive than the Liverpool, and five times more so than wet collodion—that is, if the makers of the Liverpool pellicle are right in considering it requires double the exposure of wet collodion.

I would here ask—Is a given sized flame of a paraffine lamp anything like equal in actinic light to a gas flame of the same size? I have no access to gas and therefore cannot say. I note the following experience of a correspondent of the *English Mechanic.* He says:—"When I used a paraffine light in the dark room my bath invariably became foggy. The difficulty was overcome by using a lamp to burn colza oil, the white glass being replaced by a piece of orange colour. The paraffine does not give sufficient white light to injure the sensitive plate." With regard to the paraffine lamp inducing fog in the bath I am unable to account for the cause, but should think that the plate fogged from exposure to actinic rays, not the bath. But it appears that the experience of this correspondent is that the flame obtained from colza oil is much more actinic than that from paraffine, and requires orange glass to cut off the actinic rays. I should have thought that the converse of this would be nearer the mark, considering the beautiful white light a paraffine lamp gives.

According to Colonel Wortley's experiments it appears that bromine alone is the least energetic in its action on silver nitrate of all the forms of bromine employed by him. I had thought that bromine—that is, the halogen in the free state—would be more energetic than bromine combined with a base in its decomposition of silver nitrate. However, I own that my ideas are considerably mixed with regard to the different bearings of this matter; and I rather wish that it could be *proved* that bromine has a greater affinity for silver than chlorine, since matters would be somewhat simplified.

But to return to Colonel Wortley's experiments. It appears that the affinity of the nitric acid of the silver nitrate for the base of the haloid salt has much to do with the rate of decomposition, though the different affinity of the bromine for the bases would also affect the result. This fact may affect Mr. L. Warnerke's results, and it seems to me extremely doubtful whether one bromide would prove better than another if gelatine and free haloids were used, doing away with the necessity of "keeping" before sensitising, and allowance were made for the different lengths of time the bromides take to convert the silver.

I hope that the length of this letter will not be the cause of a would-be reader not attempting it, as I really do want some help towards making a chloriodo-bromide emulsion.—I am, yours, &c.,

Herbert B. Berkeley.

Cotheridge Court, Worcester, March 27, 1876.

PHOTOCHROMY.

To the Editors.

Gentlemen,—In the article *On Things in General* which appears in your issue of the 17th inst. the writer, with his usual *sangfroid,* summarily deals with the process of M. Leon Vidal, and, taking his own want of knowledge of it as the basis of his argument, he proceeds, with amusing nonchalance of his own selected quotation, to ignore the value of the reports concerning photochromy, and shows an apparent desire to challenge its very existence. But "Free Lance" may rest perfectly assured that the process is a verity, and that many examples of it are at the present time to be seen in England.

It is now about three months ago that, by the request of another, I wrote to M. Vidal for a specimen of his work, and, with the usual urbanity characteristic of his nationality, I had two *carte* specimens forwarded at once. But I must confess here I was much disappointed with them. They form a combination of photographic transparency with chromo-lithography. In one I have just received—the portrait of a military gentleman—the epaulets and other decorations are very gorgeously gilt, and the *tout ensemble* by no means such as to make one cordially satisfied with them; but, doubtless, better examples of portraiture by the process are in existence, and for the production of *facsimiles* of art collections it would give very satisfactory results.—I am, yours, &c.,

Nomad.

March 22, 1876.

OXYGEN.

To the Editors.

Gentlemen,—As your "Peripatetic," the other week, lamented the absence of a description of Mr. D. Young's "elaboration of Mr. Noton's oxygen machine," and Mr. Noton has directed your attention to the

fact that he said something at the last meeting of the Manchester Photographic Society which did not appear in the report, I feel called upon to trouble you with a line on a subject upon which I would gladly be silent.

I do not take it to be any part of my duty to describe an article on which Mr. Young read a very short paper, because if he had desired a full description of it to appear he had ample opportunity of giving it himself in that paper. For a full account of Mr. Noton's original apparatus I refer all whom it may concern to THE BRITISH JOURNAL OF PHOTOGRAPHY, 1868, page 100, where it is fully put before the public with a diagram.

As regards what Mr. Noton said at the last meeting of the Manchester Photographic Society: I am one of those misguided people who do not care to wash dirty linen in public, and, as it appeared to me there was a small assortment of that article to wash, I left it for some one else to operate on. If any other reason were required for my silence on the subject I should say the matter was a private one between Messrs. Noton and Young, and was ruled by the Chairman to be out of order.—I am, yours, &c., C. ADIN,

Hon. Sec. Manchester Photographic Society.

Manchester, March 27, 1876.

To the EDITORS.

GENTLEMEN,—Mr. Noton's letter in last week's Journal is partly true, partly untrue; but he omits every portion which does not suit his purpose, as you will see from the copies of the three letters alluded to by him. These I enclose, and you may use them as you think proper.

Mr. Noton also omitted to tell you that when Mr Young would not gratify his (Mr. Noton's) curiosity he said he thought it was not right for Mr. Young to patent his apparatus, and has omitted, further, Mr. Young's reply, which was—"Mr. Noton thinks I ought not to have patented my apparatus," and he told me himself that the reason he did not patent his apparatus was because he was afraid he would never get his money back. This does not sound like anxiety for the free use of the oxygen apparatus. I have another letter in further proof of this if necessary.

I think it is a pity your valuable space should be occupied through Mr. Noton feeling that his apparatus is put in the shade (it can never have been very alluring, as I believe there are not a dozen in existence). If your space is to be occupied, I would suggest that we try to get some good out of this bad feeling; and I would propose that Mr. Noton and I each send five or ten pounds to you, and both apparatus be tried side by side. This would impart sound information to your readers. He whose apparatus proves the best to receive his money back, the money of the other to go to the funds of the Photographers' Benevolent Association.

If Mr. Noton does not at once agree to this I think it will prove that he has lost confidence in his pet, and also that the feeling he displays is nothing better than envy.—I am, yours, &c., D. YOUNG.

Manchester, March 28, 1876.

[We are not desirous of accepting the responsibility of the proposed pecuniary deposit, and we hope our Manchester friends will not afford us the opportunity of receiving it; but what we *do* want is such an amount of information as will enable us to gratify a strong desire expressed by numerous correspondents that we should impart all the information possible relative to the oxygen machine. From a private note accompanying the above letter from Mr. Young we are led to hope that we shall soon be in a position to say more on the subject. We know that our readers would very much appreciate a description of the apparatus, which, we observe from the list of new patents in another column, has received "protection."—EDS.]

CHEAP JACKS.

To the EDITORS.

GENTLEMEN,—A falling spark on a train of gunpowder might perchance end in a monstrous explosion, and persons who reside in glass houses should never throw stones. I am not one of those large firms so pelted in a recent issue, for mine is of moderate dimensions—two studios, enlarging studio, printing flats, and the necessary adjuncts for turning out thousands of photographs weekly.

But I think I may fairly claim to be one of the "Cheap Jacks" so neatly italicised in the letter in answer to "Free Lance" by one of the high-art professors in my immediate vicinity.

There appears to be a mistaken notion with most of the photographic fraternity, which is, that nothing but "high art" should be present in anything appertaining to photography; poor struggling human nature is supposed to appreciate "art" only in the limited form portrayed in "ugly mugs;" but still, if "ugly" (though some *are* handsome), rough, uncouth, or perhaps ignorant, their *eyes* are pleased and their hearts glow with affection and pride when they see some one dear to them placed on their walls or put carefully away in a book, to be scanned when allowed time from hard work to gaze on it. There must be some one who will work for the multitude, and it is not everyone who can induce the professor of high art to deign to descend from his pinnacle of fame (with his Guy-Fawkes slouched hat, curled locks, generally put behind his ears, with mysterious cloak, or Inverness cape when cloaks are not attainable), to operate on them.

Now, as to "low prices." There are many who cannot afford to pay high prices, yet who want photographs of *parting* friends and departed friends, children, or young babies, to send to relations, quite as much as persons of greater means. If bootmakers were so enamoured with the beautiful curves and graceful lines shown in boots on the last, and thought them so artistic as to refuse to make for any one who had not a graceful and pretty foot, why half the universe would go about shoeless. Every one would like a diamond ring and a gold watch; but if they cannot afford them they must be satisfied to go without, or wear brass instead. Many people mistake their vocations. Perhaps when some one gives a boy, for a birthday present, a drawing-slate and a pencil, his parents directly discover he has *such* a taste for drawing! This is followed by a colour box. He thinks, then, in after years, he must have been born an artist, and, if he remembered right, his mother always said he had grand artistic ideas. I once heard of a clever boy who put his hand on a red-hot iron! Yes, and he immediately took it off again without anybody telling him!

But I must keep to the point. Having failed at, perhaps, everything, our friend with the artistic proclivities turns his attention to photography. But, mark! He is as slow as a tortoise, and, while one man could take six sitters properly, he has hardly taken one. His organ of order is "nowhere" on his head. His glass room is filled with all sorts of things which look to him like art—such as old plaster figures and easels—which no one would ever use. His sitter is posed. Oh! he has forgotten to prepare a plate! He apologises. "Bless me! there's not one cleaned;" and, owing to his collodion bottle having a nice, dried fringe round the mouth, a piece of stuff comes off and drops on the plate just where the head will come. "Never mind, I'll turn it upside down; it will perhaps do." The picture is taken, the plate turned, stains are the result. "Sorry to trouble; must try just one more." "Dear me! no developer; only a little." He puts it on; not enough—the plate is stained. "So sorry, must just try one more," and so on.

It becomes necessary for him to charge a high price, for what he by mistake calls "high art" is his want of ability. He must make his sitters pay well or he would starve, and his high prices bring him very few patrons. It does not follow that because he can paint or draw a little he can also photograph. No; there is a great deal of what is *mechanical* in the photographic manipulation, though a host of the professors would be shocked if such a thing were hinted. "Truth is stranger than fiction." Slow coaches are nowhere nowadays; we live in the age of steam and progress. If large manufacturers were to gaze with delight on the many beautiful things they make, and think they were only fit for some art gallery (which very often they are, by-the-bye), where would England's greatness be? Where would the stimulus be to the large photographic manufacturers if we were bound up with the limit of "high art?" Twaddle! You must meet the demand and cater for the general public. Again: I have not heard hitherto of any Act of Parliament which insists that a man shall sell his ability at any prescribed figure, or shape the price for his manufactured goods according to the ideas of another manufacturer in his immediate vicinity. Let the public, who pay for the article, be the judge of whom they shall patronise and what they shall wear.

I find that numerous cheap photographs will bear comparison with many for which a much higher price has been paid, and which have been so elaborately retouched and worked upon to make them presentable that it is necessary to charge a high price, through the time bestowed on them, to make them pay a living profit.

Respecting the payment in advance: I am not conversant with the ways and doings of other photographic establishments (finding it is as much as I can do to mind my own business); but in mine a proper cheque book is used and a receipt given for cash paid, which plainly contracts to make a negative and supply one dozen *cartes* for the price charged. If taken on approbation an extra price is paid and proofs supplied. The money being paid in the shop saves much time in explanations, and the style being written on the cheque the operators know exactly what to do when the sitter arrives in the studio; therefore no time is lost, which is a consideration in a "Cheap Jack" business. There are no specimen frames placed at the doorway and taken in at night, for the customers have perfect confidence that they will receive value for cash paid, and persons representing the establishment are always in the way. Shops and the whole of the houses kept for photography give confidence to sitters to pay beforehand, as they know that such rents could not be met by a person whose chief aim was to fail to please his customers. No expensive set of account books is necessary either; the cash paid, a receipt is given, the cheque is presented for the cards when done, and the matter ends. "If you like the pickles try the sauce;" they recommend themselves. That is the art to go in for.

I think "high art" has something to do with the coining of words. I always had a great contempt for the expression of—"It's awfully good!" &c. Now "awful," as I have always understood, means something dreadful or appalling. It suggests some one drinking Angostura bitters and smilingly ejaculating, "it's deliciously sweet and beautiful!" What is meant, then, by calling ladies' hair "manes?" Manes are only worn by horses and mares! Yes, and by asses, too! I have only by laborious

thought discovered the idea for its use. An Irish lady might have been a sitter to the professor of high art, who perhaps in oily tones had asked —"Shall I arrange your luxuriant locks, madame?" and she, smilingly, said—"What d've mane, my honey?"—I am, yours, &c.,

235 *and* 237, *Ball's-pond, Essex-road,* JAMES SYRUS TULLEY.
London, N.; 331, *Essex-road, London, N.;*
and 24 *to* 30, *Division-street, Sheffield,*
March 28, 1876.

ANSWERS TO CORRESPONDENTS.

☞ *Correspondents should never write on both sides of the paper.*

EXCHANGES.—In our next.

B. B. J.—Place the silver in a crucible with a little borax and put the crucible on a good fire. The metal will speedily melt.

PERMANENCE (South Shields).—We have no knowledge whatever of the washing-machine about which inquiry is made.

A. JENKIN.—We have not yet had an opportunity of trying the modified developer, but hope to do so in the course of next week.

SIGMA.—It is quite impossible for us to tell what is the equivalent focus of your objective unless you intimate the focus of *each* lens and their distance apart. Supply these *data* and the rest will be easy.

DENSITY.—Give a short exposure, develope with iron, and intensify with pyrogallic acid and silver. Should the density be still insufficient apply a solution of bichloride of mercury, followed, after washing, by a solution of sulphide of ammonium.

J. Y. (Manchester).—Dissolve the gelatine in the nitric acid, and add of this enough to produce the desired effect. No definite proportions can be given; but by means of one or two trials the best proportions adapted to suit your special case will be ascertained.

N. W. FRITZ.—Bound volumes of the Journal may be obtained from the Publisher. If the Journal be ordered direct from the publishing-office you will receive it by first postal delivery on Friday morning. We shall be gratified by receiving the "hints" for the benefit of amateurs.

J. G. P.—You may either dissolve aurine in the varnish or give the plate a coating of albumen, which will readily become stained by the action of Judson's orange dye. Collodion also is susceptible of being dyed in a similar manner, but albumen produces the finest effect.

LENTICUS—It has been alleged on good authority that nitro-glycerine can be rendered non-explosive by mixing with it a small quantity of wood naphthae We have never tried the proposed method, and have no immediate intention. of making any experiments with a substance so dangerous. When it is desired to restore its explosive properties again a little water is added, by which the naphtha is absorbed, the oil sinking to the bottom of the vessel having all its dangerous properties fully restored.

H. H.—1. The operation is conducted in the following manner:—A sheet of paper having been coated with bichromated gelatine is exposed under the negative in a printing-frame. It then receives a coating of a stiff ink containing a large proportion of varnish, and the image is developed in warm water by friction with a sponge. Pressure in contact with a polished zinc plate ensures the "setting off" of the picture upon that plate, which is afterwards treated by acid so as to leave the protected portions in relief.—2. Leitch and Co.

"GLYCERINE" (Stockport) writes:—"About three years ago you gave in the Journal a formula for keeping wet plates moist for about a day. The ingredients were honey, glycerine, kaolin, and, I think, a little nitrate of silver; but I forget the relative quantities. If you would kindly put me to rights in your next issue I should be much obliged."——In reply: Mix the ingredients together in the following proportions:—

Distilled water	7 ounces.
Glycerine	2 ,,
Honey	1 ounce.
Negative nitrate bath solution	$1\frac{1}{2}$,,

Then add about half-an-ounce of kaolin, shake up and expose to sunlight for two or three days. If sufficient kaolin have been added a black mass will sink to the bottom, leaving the solution clear and bright. This will keep well for years. When a plate has been collodionised and excited it is drained, and a little of this solution is applied to the surface. If the collodion be suitable, a plate thus prepared will keep well for several hours.

CHROME ALUM.—Our correspondent writes as follows:—1. Will you kindly inform me how to deposit silver upon a gelatine film—I mean the quantities for electrotyping?—2. Is anything done to the relief to keep it so, or is it at once put into the copper solution?—3. Is it possible to get half-tone by electrotyping by the method described in the Almanac? At page 270 of Hunt's *Photography* he says yes, but iodide of silver is used. Will you kindly suggest quantities?—4. What is the object in using the iodide of silver? the autotype sensitiser gives most perfect results.—5. Your articles on phototypie, &c., have given the greatest pleasure to many of my friends, but they are very anxious to know your method of doing the blocks.—6. Lastly: Are not Mr. B. J. Edwards's and Mr. Dallas's methods something very similar to this one?——We reply:—1. One among several ways of depositing silver upon gelatine is to brush the surface over with an alcoholic solution of nitrate of silver, and then apply pyrogallic acid.—2. The relief need not be subjected to any treatment, but may be transferred direct to the solution.—3 and 4. We have never been able to ascertain the use of the iodide of silver, which was added by the late Herr Paul Pretsch. It is generally conceded that it did not serve any useful purpose. It is possibls to obtain admirable half-tones without such addition.—5. It is probable thae we may during the present year have articles on some of the details of the process.—6. The processes of Messrs. Edwards and Co. and Dallas are quite different, if we are to judge by the results obtained.

DIOGENES.—1. There are several ways by which paper of the kind required may be prepared. The following is a good method:—Float the paper upon a solution of ammonio-oxalate of iron, dry, expose under a negative, and immerse in a solution of ferridcyanide of potassium.—2. See Mr. M. Carey Lea's article in our issue of March 3.—3. Dissolve the rubber in benzole.

RECEIVED—too late for insertion in this number—Thomas Annan; F. R; J. A. Hirst; W. H. Wells; Christoph. Aër; B. B. C; W. M. Ayres.

SUDDEN DEATH.—A photographic artist named Thomas Henry Hargrave, from Chester, whilst in the act of arranging his apparatus to take a lady's likeness at Keady, county Armagh, on Monday, the 20th inst., suddenly fell and expired.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.—The next meeting of this Society will take place on Tuesday next, *April* 4 (instead of the usual second Tuesday), when a description of an entirely new system of photography, communicated to Mr. John Spiller, F.C.S., will be given, and some illustrations of the process shown.

AGENDA PHOTOGRAPHIQUE.—We have received from M. Leon Vidal an elegant little pocket-book containing almanac, diary, and other matters of interest, especially to continental photographers, among these being a list of the photographers in Paris. It is illustrated by a portrait of a lady printed in carbon from a negative by M. Charles.

THE HOLDERNESS HUNT.—An enlargement in carbon of a combination-picture of the *Holderness Hunt*, by Mr. George Cooper, of Hull, is at present on view at the Gallery of the Autotype Company, Rathbone-place. The picture is of large dimensions, viz., 6 × 4 ft., and includes fourteen figures on horseback, accompanied by a pack of hounds. These have been grouped and printed in an effective manner.

AMATEUR PHOTOGRAPHIC ASSOCIATION.—A council meeting of this society was held on the 22nd inst.,—Sir Antonio Brady in the chair. The minutes of the previous meeting having been confirmed, the following members were elected:—S. G. Fairtlough, Esq., R.A.; W. H. Danby, Esq.; Major C. Warde; J. S. Milner, Esq.; and Miss E. A. Fazarkerley. The Secretary laid before the council a letter from Mr. J. C. Stenning respecting the retention by the Society of the prize negative; but the subject being important, and the council most anxious to meet the wishes of many members, it was deferred for final decision till the next council meeting. Mr. Glaisher then proposed that copies of the prize pictures for the past year should be exhibited at the next meeting of the Photographic Society. This, after being seconded by Mr. Sopwith, was decided by the meeting.—A. J. MELHUISH, *Hon. Sec.*

THE BIRD'S NEST.—We have received from Mr. William Cobb, of Woolwich, a set of six photographs in which he has told in an inimitable manner a story of a bird's nest. A little urchin four years' old, together with his big brother of the mature age of eight years, have found a bird's nest, which affords the theme for the first picture, *Temptation*—"Let us take it home." The second picture shows a scene on the road, where the nest is being carried homewards. Arrived at the domestic residence we find the brothers in anxious consultation; hence the third picture, *Remorse*—"What will mamma say? followed by *Reproof*—"Take it back at once," Mamma's stern look and pointed finger indicating that no half measures will satisfy her. The other two scenes are, respectively, *Restitution*—"Do make haste," and *Satisfaction*—"It's all right, now." We have before had occasion to speak of the masterly manner in which Mr. Cobb composes his groups of children—a department in which he has few rivals. In this series he has exceeded himself—the expressions, positions, and general composition being admirable.

PATENTS APPLIED FOR.

February 4, 1876.—"Improvements Connected with Apparatus for Exhibiting and Copying Pictures by the Oxyhydrogen or other Light, Parts of which are also Applicable to Making Oxygen Gas for other Purposes."—No. 463. D. YOUNG (of Swinton).

March 10, 1876.—"Improved Photographic Apparatus." (Communicated by W. A. Brice.)—No. 1050. A. M. CLARK.

March 17, 1876.—"Production of Ceramic Photographs."—No. 1148. A. L. HENDERSON.

LONDON GAZETTE, *Friday, March* 24, 1876.

PETITION FOR LIQUIDATION BY ARRANGEMENT.

H. HARPER, Leeds, restaurant keeper and photographer.

PARTNERSHIPS DISSOLVED.

BYRON AND SON, Nottingham, photographers.

H. P. ROBINSON and N. K. CHERRILL, Tunbridge Wells, photographers.

CONTENTS

THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 831. Vol. XXIII.—APRIL 7, 1876.

A NEW METHOD OF PHOTOGRAPHY.

The fact that it had been announced that "a new method of photography" was to be brought forward at the last meeting of the Photographic Society of Great Britain was sufficient to account for a much better attendance than usual; and when it was perceived that this attractive title was, in a sense, a misnomer a corresponding amount of disappointment was experienced. As will be seen, the true title of the paper read by Mr. Spiller should have been *A Note on the Production of Antimony Photographs.*

It appears that at a recent meeting of the Chemical Society the subject had been introduced by Mr. Francis Jones, the author of the process of printing now to be described, and Mr. Spiller considered it a matter especially interesting to photographers; hence he brought it before the meeting. Several specimens of ferns produced, by superposition, by the new process were exhibited. These were of an orange tint, and not likely to prove of value from an artistic point of view; but it was shown by illustrative specimens that subsequent treatment with ammonio-nitrate of silver or ammonio-sulphate of copper ensured more agreeable tones.

The process is based upon the reaction which takes place between sulphur and antimoniated hydrogen, or stibine, in the presence of light, by which sulphide of antimony results as the product of the decomposition. A sheet of paper is impregnated with sulphur by means of a solution of this elementary body in bisulphide of carbon. And here we may observe that, at the meeting on Tuesday evening, a method was suggested by Mr. J. A. Spencer which appears to be capable of yielding a deposit of sulphur in a much finer state of division than that adopted in the specimen pictures shown at the meeting by Mr. Spiller. Mr. Spencer's proposal is that after immersing the paper in a saturated solution of hyposulphite of soda the paper thus treated should be subjected to the action of acid, by which, as every photographer well knows, the hyposulphite will be decomposed and sulphur liberated in the form of an extremely fine powder.

On paper charged with sulphur, no matter by what means effected, the future picture is to be produced. But the sulphur is not affected by light until each atom becomes surrounded with an atmosphere of stibine, or antimoniated hydrogen. Means must, therefore, have been effected by causing the pads of the printing-frame—or, at anyrate, the sulphur paper already spoken of—to be impregnated with this very poisonous compound of hydrogen and antimony, which is known respectively by the designations "antimonetted hydrogen," "antimoniuretted hydrogen," "hydrate of antimony," and "stibamine," in addition to the terms we have employed. This gas may be produced in more than one way, but it is probable that the easiest method of obtaining it is by dissolving an alloy of antimony with an excess of zinc in dilute sulphuric acid, when it is freely evolved. It must be conducted from the generator to the printing-frame by means of an india-rubber tube which passes through the back of the frame, so as to allow the gas to impregnate the felt pads behind the sulphur paper. The substance resulting from the action of the gas upon the sulphur is sulphide of antimony, well known as an orange-coloured body. But as the reaction takes place only in the light, it will be at once apparent that such portions of the paper as are protected from luminous action by the superposition of a fern, a negative, or other light-obstructing medium will not undergo the same change, and hence the production of a photograph. The gas does not, as one speaker at the meeting observed, act as a developer, but as a sensitiser; for without the presence of this gas, and without the further presence of light, the sulphur upon the paper is quite inert.

The sensitiveness of the paper is not very great; for, if we rightly understood Mr. Spiller, an exposure of from ten to twenty minutes in the sun is required in order to produce the desired effect.

It is, perhaps, a little premature to offer any opinion upon the future of the process which, in consequence of anticipatory announcements, created so much interest among the metropolitan members of the Photographic Society of Great Britain; but we have a strong impression that the proposed process will be relegated to the limbo of what are termed "interesting" processes, of whose existence photographers are sufficiently content to be made cognisant without once entertaining the idea of subjecting them to the test of experiment. We incline to this opinion because of the troublesome nature of the process of printing indicated, the noxious character of the gas which forms such an important agent in it, and the very unsatisfactory quality of the tones obtained. It is true that, by subsequent treatment with certain silver or copper salts, the tone may be improved; but we believe that photographers will prefer silver printing pure and simple to a process such as that we have here described, which involves disadvantages not compensated for by qualities that can be recognised as of a progressive character.

ON SYMMETRY IN THE SHAPE OF PHOTOGRAPHS.

A paper was read at one of the recent meetings of the South London Photographic Society on the subject of *Magnitude as an Element of Attractiveness in Photography*, in which the writer attempted to show how the mere size of a picture may add materially to its beauty and artistic effect under particular circumstances; and if such be the case, as it no doubt is, with how much greater force will the element of shape act in the same direction! It has been said over and over again that half the photographs taken are spoiled for want of a due amount of sky or foreground space, or, on the contrary, by superabundance; and no one, after looking over a portfolio of pictures by even our best photographers, will be inclined to consider that an exaggerated estimate.

The fault is perhaps in one respect not altogether the photographer's, but is to some extent to be traced to the unsuitable dimensions, laid down by custom, of the plates employed in photography, and which, in spite of a few attempts in the direction of novelty, still seem to hold their ground. There are certainly very great differences in the shape (that is, the proportionate length and breadth) of the plates used, varying, as they do, from the actual square to an oblong whose sides stand in the relation to one another of nearly two to one, as in the case of $8 \times 4\frac{1}{2}$—a size which is used by many; but almost every individual subject requires special treatment in this respect, and shows to the greatest advantage if rendered of a particular height and breadth. It has been strongly urged upon

photographers by many—notably by the late Mr. Sutton—to use the knife freely in cutting superabundant portions of the sky or foreground before mounting the prints; but they as a class seem loth to follow the advice given, apparently valuing their pictures according to the number of square inches they cover rather than by their inherent artistic qualities.

As a rule it is found in general landscape work that a tolerably long oblong is the most useful shape, the longer side forming the base line, but there are also numerous subjects met with which require that order to be reversed, or the shape to be modified to a square, a circle, or even an oval. Turning to a collection of landscape *paintings* it will be noticed that the symmetrical dimensions are very varied; but it must be borne in mind that the artist may so modify or exaggerate his picture as to make it suit his canvas without destroying the artistic effect, while it rests with the photographer to suit his plate to the subject. It is probably for the reason that the "cabinet" plate proves the most generally suitable for all classes of subjects, as well as being adaptable to stereoscopic work, that it is so much used by amateurs, for it is obviously impossible to travel with a different camera suitable for each subject that may be met with. An additional advantage, utilised in connection with this and other forms of camera, is the power of using it with the longer side of the plate either horizontal or vertical at pleasure. The latter is useful when photographing interiors and certain other forms of architectural work, and occasionally with such subjects as river scenes, narrow ravines, and the like.

A fashion has recently arisen of using square plates and cutting away the unnecessary portions of the prints, but many object to this plan on the score of economy, as the extra cost of the useless glass, together with the film it carries, to say nothing of the waste of paper (unless the latter be cut to the required size previous to printing), mount up to a considerable percentage of extra expense if much work be done. But it frequently occurs that, in spite of either the square plate or the long oblong shape, subjects are met with which cannot be rendered artistically without considerable waste of material—such, for instance, as a wide stretch of tolerably distant scenery with no immediate foreground. Such a subject, if rendered upon one of the ordinary-shaped plates, takes the form of a mere *strip* of picture, the greater portion of the plate being occupied by unnecessary sky, and presenting a most hideous appearance; whereas if cut down to the necessary dimensions it would form a fairly presentable "panoramic" effect.

To render the production of such exceptional subjects possible with an ordinary form of camera of, say, the size of 10 × 8 or 12 × 10 by adapting an extra front for the special purpose, and dividing the interior of the camera by a partition as is the custom in stereoscopic work, it is possible to produce upon one plate two long and narrow pictures of the panoramic style. A camera for plates 10 × 8 adapted in this manner, which we had the pleasure of inspecting some years ago, was fitted with a movable central partition, or, rather, with two, crossing one another in the centre, so as to divide the plate into four equal parts, any one of which might be exposed singly as a 5 × 4 picture, or by removing one of the "wings" one half of the plate, either 10 × 4 or 8 × 5, might be utilised separately, thus rendering it possible to employ the camera for the production of four different sizes and shapes of picture in addition to stereoscopic.

The front, which was a double sliding one, was so formed that the central portion carrying the lens was adjustable in any position in the aperture, so that the lens, by reversing the position of the front, aided by the sliding arrangement, might be brought opposite to the centre of each of the halves of the plate. A similar arrangement permitted the production of single 5 × 4 pictures as well as stereoscopic ones upon the 8 × 5 plate. An improvement on this principle—which we had not the pleasure of seeing in operation, as it was unfinished when we inspected it—consisted of a circular revolving front carrying different lenses, which it was possible to bring round to any desired portion of the plate, the front being held by a spring catch when the lens was in its proper position. This arrangement, though rather bulky, did away with the necessity for different loose fronts, which are liable to get lost when travelling. The work produced with this camera was really marvellous, as it enabled its owner to produce with one apparatus the results of no fewer than four. Not the least of its advantages consisted in the fact that views which were scarcely suitable for so large a size as 10 × 8 might be taken upon one of the smaller portions, while at the same time one subject might be utilised in different sizes for the various purposes of the stereoscope, the album, portfolio, or for framing.

ON COPYRIGHT IN PHOTOGRAPHS.

Notwithstanding all that has been written in connection with the Act which in 1862 first gave copyright in photographs, it is possible that ambiguity may still exist in the minds of both photographers and their *clientèle* as to the precise bearings of the Act.

The object of the Copyright Act—briefly stated, so far as photography is concerned—is to give to photographers a copyright during their lives, and to their heirs for seven years afterwards, in all such works as they may produce for themselves. This, of course, will include the great bulk of landscape work, much of the copying of pictures and statuary, and most of the portraits of public men whom the artist may have induced to sit to him. This clause of the Act is so clear that no difficulty, so far as we know, has arisen in its interpretation. The case is, however, materially altered when it comes to deal with commissions executed to order; as, for example, when a picture is brought to a photographer to be copied, when he is commissioned to photograph a landscape or architectural subject, or when an ordinary portrait, or any number of portraits, is taken in the studio. It is just here, where there was most necessity for perfect clearness, that some little haziness in the construction put upon the Act exists.

It is perfectly clear that the copyright of all negatives is vested in and remains with the person who gives instructions for the work to be done, and that it can only be vested in the photographer by a written agreement signed at or before the time when such order or commission is given. But, as the Act says nothing about the property in the negative, it has been variously held by those whose divergent interests are involved that such property remains with the photographer, and that it passes with the copyright to the client. It is on this question that most of the litigated cases have arisen.

Now we conceive that when a clause of an Act of Parliament is so obscure as to give rise to varied interpretations, the best way to arrive at a correct understanding would be to look rather closely into what may have been the probable intention of the framers of such clause. In the case in point it may have been merely to protect the sitter, in the case of a *carte*, from the annoyance of seeing his or her portrait published and scattered throughout the length and breadth of the land, or to prevent copies of pictures or statuary being produced and sold without such consent. If so, there could be no objection to holding that the negative itself should belong to the individual by whom it was taken. But it may have been—and we think the general tenor of the Act favours the belief—that it was intended that the commissioner should really have something more than the right to prevent the undue use of the negative for which he or she has paid "a good or valuable consideration," and that the property in the negative should accompany the copyright. Keeping in view the belief that the copyright was intended to be something possessing specific property, it may help to a proper understanding of what is fair and just if we briefly consider what, without property in the negative, such copyright confers.

Take an ordinary case where, say, a commission for a large direct portrait is received, and where we are entitled to suppose the charge made by the photographer is sufficient to cover not only the value of the one print supplied but also to include "a good or valuable consideration" for the negative, without which the print could not have been produced. Or, take a case of ordinary *carte-de-visite* work, of which the price list of a well-known house now lies before us. From this list we learn that a first copy costs seven shillings and sixpence, and subsequent copies one shilling each. Now it is evident that the extra six and sixpence charged for the first copy is entitled to be held as the "good or valuable consideration" for the production of the negative.

It may not be sufficient remuneration for the work, but that is the photographer's business; and whether it is or is not does not alter the nature of the argument. The copyright, in virtue of the Act, is vested in the commissioner, but it is not of the slightest value unless it carries with it the right to the negative for which payment is supposed to have been made, and which is absolutely essential to the utilisation of the right which the law has given. Of course it is quite true that photographers generally will study their own interests and retain the negatives, so as to be available for the printing of such copies as may be afterwards ordered; but they are not under any legal obligation so to do, and, therefore, if the Act really was intended to make such copyrights of real value, its authors could never have meant to make such property dependent on the caprice or will of the photographer.

In whatever way the question may be settled we think it desirable, in the interests of all concerned, that all doubt should be set at rest, and a judicial decision by which a precedent might be established would be of great value. Moreover, we confess to a feeling in favour of its being settled in what we cannot avoid considering the common-sense view of letting the negative go with the copyright, as we are quite sure that photographers themselves would be the first to benefit by the decision, in securing a large amount of profitable work, of which, in the present uncertainty as to property in the negative, they are now deprived.

We are quite aware that this view of the question will not at first sight be popular with a large number of photographers, but there is no necessity for such a decision injuring them in the slightest degree. The Act provides very clearly for the investment of the copyright, by the simplest possible machinery, in the artist. All that is required is to reserve the copyright to himself by an agreement in writing, to be signed at the time or before taking the order. This could be readily done, and should in all cases be done, by a simple entry in a printed form to be signed when the order is given. In ninety-nine cases out of a hundred such a form would be signed without question, and what is now a matter of doubt and not unfrequently of disputation would become a legal arrangement mutually satisfactory to all concerned.

RECENTLY PATENTED INVENTIONS.

No. VII.—VANDERWEYDE'S SYSTEM OF LIGHTING.

We have before so fully expressed our opinion on the soundness of the principle underlying Mr. Vanderweyde's patent—namely, the transmission of light to the sitter *directly* instead of *obliquely* through glass—that we have here nothing further to add to what we have already said. When we brought the system under the notice of our readers last summer we promised, in reply to numerous communications we had received on the subject, that we should publish the completed specification at the very earliest opportunity. We now redeem that pledge by appending a copy of that document:—

My invention relates to the construction of photographic studio windows, and has for its object to ensure the more efficient lighting of the sitter and the partial or total exclusion from the studio of all useless or mischievous light; that is, light not reaching the sitter or helping to produce the image, but which by causing injurious reflections destroys relief in the picture.

By my invention I am enabled to effect the concentration upon the sitter or upon the objects forming the picture of the greater portion of the light entering the studio, and to acquire such control over the light as to permit the production of any effect, proportion, and relation of light and shade in the photograph as may be thought desirable.

It has long been known—1. That all light, direct or reflected, entering the studio ought to illuminate only the sitter and objects to be delineated in the picture and nothing else. 2. That no light, direct or reflected, should enter the camera except that proceeding from the illuminated objects which are required to form the picture. 3. That as light always travels in straight lines, and as only those rays which reach the glass at right angles pass directly through, all others being more or less thrown off by reflection, it follows that the greater portion of the light entering a studio window of the ordinary flat construction does not reach the sitter, but passing through the glass to the opposite side of the room is thence reflected in a variety of useless directions.

Although the foregoing will be generally admitted, no means has been yet devised of ensuring these conditions without interfering with the general form and arrangement of the studio.

Attempts have been made to construct the window with the panes of glass facing towards one end of the room, but all plans hitherto suggested have been of necessity abandoned, either in consequence of the window intruding so much upon the space in the room as to interfere with and cramp the movements of the operator, or otherwise entailing disadvantages which more than counterbalance the benefits derived.

It is found in practice that, in order to obtain delicate modelling and roundness of the image, it is necessary with the ordinary flat construction of studio window to recede the sitter towards the end of the room where the rays of light fall upon him in a better direction than when he is placed directly opposite or under the window. But in proportion as the direction is improved the quality of these rays decreases in value in consequence of the light striking the glass obliquely (the angle varying with the distance of the glass from the sitter), whereby the light is obstructed by reflection and absorption to a considerable extent. It is thus obvious that, in order to obtain the full benefit of the rays of light passing in the direction of the sitter, they should traverse the glass in its thinnest direction—that is to say, at right angles.

Now my invention consists in such a construction of photographic studio window that the rays of light passing to the point occupied by the sitter shall traverse the glass as nearly as possible at right angles to the plane thereof, the construction of the window being such that it does not encroach upon the space within the room, or otherwise involve such objectionable alteration in the general construction of the studio as is the case with the plans hitherto proposed. To this end, instead of the ordinary flat window I construct the window of a zig-zag form in horizontal sections, the window being thus composed of two series of vertical strips or panes of glass disposed alternately, the two series facing points at opposite ends of the studio, while the window as a whole is, so to speak, straight or in a line with the side of the room. The panes of each series are placed at angles varying with their distances from the said points, at either of which the sitter may be placed, according to the most favourable direction of the light. The sitter, at whichever end of the room he may be placed, can only see the panes of glass which face him and the light which they admit.

The other series of panes facing the end of the studio may be obscured by blue opaque roller blinds or by shutters, so as to exclude at will the light, which would otherwise pass in and reach the camera and other objects without illuminating the sitter. Or these panes may, if preferred, be left undarkened without interfering with the concentration of the light upon the sitter.

Both series of panes are of course similarly provided with blinds or shutters for use in controlling the light, as may be required. In thus arranging the glass in series alternately facing opposite points in the studio, it is important to so dispose the glass that the panes of the series through which the light is not admitted for the time being, the sashes in which they are fixed, and their respective blinds in shades shall obstruct the least possible amount of light passing in the direction of the sitter. To this end, therefore, each series, whilst made to face as nearly as possible towards the one point, is placed exactly edgewise or radial towards the other point. The glass is thus placed in the most favourable position for the passage of the light, which is but slightly obstructed by the sashes and frames, and I am enabled to combine greater lightness of construction with the necessary strength.

The invention is applicable both to side and top "light," and might be used on one or both sides, but the north side and roof will generally be sufficient.

By my invention there is a greater concentration of light upon the sitter (with actually less light entering the studio, if the other set of panes be darkened), the resulting advantage being to reduce the time required for exposure and to give to the image obtained greater roundness, vigour, and delicacy of modelling.

Here follows a description of certain drawings accompanying the specification, which have already appeared in The British Journal of Photography, and hence are not required in this *résumé,* after which we find the following definite claim:—

Constructing a photographic studio window of a zig-zag form, as herein shown and described; that is to say, with the panes of glass disposed in two alternate sets facing opposite points, the panes of each set being edgewise to the one point and facing the other point as and for the purpose specified.

I also claim constructing a photographic studio window with one set of panes only disposed at angles varying with their distances from the point towards which they all face, the intermediate panes being darkened or replaced by sheet metal or otherwise, as described, the arrangement in either case being such that the window as a whole is straight or in a line with the side of the room.

Our readers are now in a position to understand definitely the nature of Mr. Vanderweyde's invention and the precise extent of his claims. We understand that a large model of his invention has been constructed, which is now being exhibited in the provinces.

PERMANENCE OF SILVER PRINTS.

May I be permitted to contribute to the present important discussion on silver prints a few facts gathered during an experience of many years in their production?

I observe that Mr. Mayland, in the last *Year-Book*, refers to the superior quality of the albumen of commerce a few years ago as compared with more recent samples, and thus accounts for the prevailing opinion that prints are less permanent now than they used to be. Mr. Robinson, in his letter of last week in the *News*, lays, and I think justly, the chief blame of instability on the albumenised paper, although I cannot follow him in his remark that foreign paper is necessarily a greater delinquent than our own. In my opinion floating paper on stale albumen and incipient decomposition of the hypo. bath are the chief causes of instability in silver prints. Both evils, I believe, are preventible; and with proper attention, as I hope to show, there is no reason why silver prints should not be as permanent as any other, and no one will dispute that they are more beautiful.

My own experience, then, confirms my belief that paper originally floated on fresh albumen will keep many days after being sensitised on the silver bath; but, if the same sample of albumen is kept for a fortnight, paper then floated on it will certainly have a richer gloss, but will turn brown the very next day after it is sensitised. I am persuaded that fresh albumen has a great deal to do with permanent silver printing. Foreign paper, merely because it is foreign, has nothing to do with it. But any paper whatever if floated on stale albumen will produce unstable prints.

Again: the permanence of silver prints depends no less intimately on the proper management of the hypo. fixing bath. Now, what is the usual mode of fixing in hypo.? Why, this:—The printer starts with two pounds of hypo. diluted in the proportion of four ounces to a pint of water, and from time to time either adds a handful of crystals by rule of thumb, or he keeps by him a saturated solution of hypo. out of which he adds to his fixing bath diluted hypo. in the original proportion mentioned above. Now, here, I have no doubt, is the chief cause of prints ultimately turning yellow. After a certain number of sheets have been fixed in a bath managed in this way a decomposition of the hypo. is set up. No addition of fresh hypo. to the first solution will ever get rid of the products of this decomposition. The prints never acquire the juiciness one likes to see; they always retain a yellow appearance after fixing in a bath in which this decomposition has begun.

Here, also, I can perceive the truth of the remark often made by printers—to the effect that the prints just immersed in a fresh hypo. bath looked and kept well, as a rule; but not so those of a subsequent lot. Of course not, as I can well understand. By the time the later lot reached the bath the hypo. had begun to decompose, and from that moment, unaffected by any addition of fresh crystals, imperfection and instability awaited the subsequent prints. There is no way of avoiding this but one—and that is by throwing away the hypo. solution at a certain stage—as I shall presently show. I may mention, in passing, another objection to the haphazard method of reinforcing the hypo. bath by addition of handfuls of crystals to it. Strong hypo. solution is injurious to the shadows of a print quite as much as strong cyanide does injury to the high lights of a negative.

The following method of managing the hypo. fixing bath I have found to be very superior to that commonly adopted, and to obviate all danger of the decomposition referred to:—Every sample of hypo. I procure I first of all test for neutrality. To prepare a fixing bath for prints I dissolve five ounces in two and a-half pints of tepid water. If it be not perfectly neutral I add from a pipette five drops of a saturated solution of common washing soda. Prints to the number of five sheets, and no more, are kept in the bath fifteen minutes, and frequently turned over; they are then placed in a bath of tepid water. As soon as five sheets have been fixed the hypo. bath must be thrown into the waste barrel and another made up of the same strength. For this purpose I keep hypo. crystals in paper packets of five ounces each, previously weighed. When all the prints have been fixed and washed in tepid water they are transferred to the rotatory washing bath, in which they circulate and drain alternately till next morning.

As regards the gold toning bath: I may add, for the sake of giving a complete account of my methods, that I prepare my own gold, using two ounces of pure gold at a time, which come out, after dissolution, four ounces of terchloride of gold, and are then three times crystallised. I never neutralise the gold stock with an alkali, and I keep the whole of it in permanent solution in one and a-half gallon of common water, or two bottles holding six pints each. To prepare a toning bath I add ten grains of terchloride of gold in solution to three pints of tepid water, and neutralise it with a little lime water in the proportion of three parts to one of acid gold. The bath at first is turbid, but the addition of one grain of terchloride of gold for every sheet to be printed will partially remove the turbidity. If the bath be sluggish at starting I have in readiness a sixty-grain solution of chloride of calcium, originally prepared in boiling water. Of this I add to the bath from half-an-ounce to an ounce, which sets the toning going. The first ten grains of terchloride of gold will tone five sheets; after that one grain per sheet is my calculation. Liberal use of gold much improves the prints by shortening their stay in the toning bath. The bath is never used twice. At the end of the day's work it is thrown down for future reduction, and next day I begin another.

Before toning, the prints should be passed through three baths of tepid water. Both toning and fixing baths are tepid, and so is the water for first washing the prints after fixing. I use an intermediate tepid washing bath between toning and fixing after they are toned. The tepidity of all the baths is maintained in summer and winter alike.

Such is an outline of my method of producing silver prints. The cardinal points to attend to for stability of prints are the neutrality of gold and of hypo. baths, and the rejection of the fixing bath after every lot of five sheets has passed through it. If these rules are carefully followed I am persuaded there will be no disappointment caused by fading prints. Scrupulous adherence to the formulæ approved by experience, regardless of a little trouble at the outset, will in the end repay the operator. When he once establishes a regular routine he will find the system I recommend quite as easy as any other to follow; and I think I can guarantee him ever after against the reproach of a faded print, provided he secures paper floated on fresh albumen. W. M. Ayres.

GELATINE EMULSIONS.

Referring to "F. S. K.'s" interesting paper in your last issue, and your remarks thereon, I, too, have been working for two winters, making various gelatine emulsions.

It is probably well known that a very slight degree of over-exposure ruins a gelatine plate, it being next to impossible to intensify one over-exposed. My idea at starting was to learn some way to get an excess of density, thinking, if this could be obtained, that then, if a plate were accidently over-exposed, I could stop development, fix, and intensify to printing density, and so save it. This I thought would rob the gelatine process of much of its present glorious uncertainty.

I soon succeeded in getting a dense plate, but, to my surprise, no rapidity; the slowest collodion plate I ever tried required less exposure. As I felt this would not answer I immediately commenced to work for a rapid plate, and tried every salt and combination of salts I could think of—both bromides and chlorides—always thinking, as every one else appears to have done, that it was necessary to have an excess of bromide or a restraining acid. For a long time I got plates which gave black, brown, and greenish images, but needing from fifteen to thirty seconds' exposure to a gas flame to secure a transparency, until one day I made a batch which needed only two seconds. I was greatly pleased to feel that at last I should succeed, and on looking at my formula to see how I had done it I found that I had made a mistake in estimating the necessary quantity of bromide to convert the silver nitrate, and that there was in my emulsion free silver and no restraining acid. I have since made emulsion with as much as four grains of free silver to the ounce, which developed without fog, but so large an excess does not make so rapid a plate as rather less than one grain of silver in excess.

The following formula gives the most rapid plate I have made:—

Nelson's opaque gelatine	22 grains.
Nitrate of silver	18 „
Bromide of ammonium	10 „
Water	1 ounce.

Plates made from this emulsion will give a fully-exposed negative (out-of-doors) in six to eight seconds with a double-combination lens, $\frac{1}{16}$ stop. I can get them up to printing density, but they are not all that is to be desired in this respect. Of other salts that I have tried with excess of silver K Br. gives a slow, thin plate, Cd. Br. gives a slow but dense plate, Am. Cl. slow, but more dense than K Br.

The action of various salts in gelatine emulsions are as yet but little understood, and the whole subject needs a course of careful experiments on the same plan that Herr Warnerke is so admirably working at collodion.

Gelatine is still in its infancy, and I believe that if each gentleman who works it would publish the results of his successful experiments in the way of density, keeping qualities, and rapidity, we shall at last have gelatine plates as certain as collodion, and, at the same time, much more rapid. FRANKLIN.

NOTES ON PASSING EVENTS.

By a Peripatetic Photographer.

If patents have never done even one good thing, as some people assert, they have at least done this—that they compel an inventor to make a clean breast of his "outcome." Henderson's photo-enamels are confessedly beautiful; by what means he produces them is a question which has long been classed among those more easily put than answered. Time—by which I mean six months—will show the precise nature and value of the invention, and thus one of the most important uses of a patent is that everything constituting the special claim must be plainly described, so that the whole world may be made aware of the details of the discovery. In six months hence, then, the photo-enamelling secret will be revealed. Our patience must, therefore, be curbed till that period has elapsed. If by this process photo-enamels can be properly burnt-in by a firing not exceeding half-a-minute, it is not at all difficult to jump to the conclusion that the process ought to be a very cheap one; for, the cost of the photograph itself being presumably "next door to nothing," and that of an enamel tablet only a few pence, the expense of finished enamels, executed at the declared rate of twelve per hour, is not difficult to compute.

There is something in connection with the gelatino-bromide process which I do not quite understand. Kennett prepares plates which are said to be *more* sensitive than those prepared by collodion; and I wish to know why this should be so. It is not the material surrounding the bromide that confers sensitiveness; therefore a batch of argento-bromide atoms embedded in gelatine ought not to be more sensitive than the same or, rather, a similar batch of atoms embedded in collodion. Why, therefore, should there be a greater degree of sensitiveness manifested in one case than in the other? That is what *I* "want to know." Are we going to be driven to this position, viz., that the condition under which bromide of silver is formed, in its relation to organic surroundings, is to be the determining point of its sensitiveness? I imagine that such must be our faith until a clearer light is shed upon the subject, till which time I leave this important and interesting subject. But, shall I not be considered a paragon not less of wisdom than of originality when I say that we want further revelations ere our ignorance be enlightened in any marked degree?

Silver printing *versus* carbon printing: this was a question which proved exceedingly exciting and important to photographers some years ago, but it then possessed not a tithe of the interest attached to it nowadays. Circumstances have led to its resuscitation, and who so cowardly as not to follow where truth leads! But what is a synonym for *truth* in connection with photographic printing? Is it not permanence? Carbon, *per se*, is, we know, unalterable; but carbon does not appear to be always what it purports to be, for we sometimes find it has associated with it a great many things which, like the ghosts and fairies of our childish days, quickly, if not mysteriously, depart at the first gleam of sunshine. It is well known that in itself carbon or lampblack is not a charming colour, and that to make it "go down" it must be modified—"warmed," I believe, is the word—such warming being effected by a pigment which, as one of our glorious English glees says or sings of darkness, "flies away." Rightly or wrongly, pigment printing seems to have fallen under suspicion at the present time, and it becomes a question of the very highest importance that the directors of the movement bestir themselves and allay all suspicion connected with an enterprise of so much possible value.

The dry-plate camera of "T. H.," recently described in this Journal, suggests a thought. It is not really necessary that dry-plate devotees who go to the country to take, say, a dozen views should be the happy possessors of either half-a-dozen double dark slides for the camera or of a changing-box. All that is necessary, in the absence of either of the above-named conveniences, is that one should have a sister, wife, or female friend who is dexterous with the needle and who can devise and execute such a simple piece of fabric as I shall here describe. I premise, first of all, that there must be two hooks or projections from the back of the tailboard of the camera upon which a plate-box can be suspended, and that it must be suspended in such a manner as to place the face of the plates towards the lens end of the camera; when the lid of the box is opened, the door of the dark slide being also opened, a plate can very easily be lifted up from its grooves in the dark box and transferred to its place in the dark slide, which ought to be *in situ* in the camera. Of course the light would have access to the plate; but here is now introduced the female friend aforementioned, who must make a hood of two thicknesses of black calico, which shall slip over the back of the camera and enclose the box of plates. By means of sleeves in the sides of the hood the hands are introduced, and the transference of plates from box to camera is effected without difficulty and without permitting any light to find access to the sensitive surface.

"Carbon tissue is made by the mile in Glasgow;" so declares the President of the Glasgow Photographic Association—a body which already appears to have exhibited great vitality. Suppose, then, that photographers were to purchase and use for photographic purposes this tissue manufactured for a totally different purpose, how about any real or alleged patent rights that may exist in connection with the production of photographic tissue? Did Blair ever take out a patent for the production of tissue? That gentleman, I imagine, was the first in the field; and if he obtained a patent does it still exist? If the answer be in the negative as concerns Blair, is there any other patent in existence for making tissue? This is a subject which will bear a good deal of ventilating, and it is pleasing to find that the photographers of Glasgow seem determined to investigate the matter. I am not here referring to patented methods of working the carbon process; my remarks bear directly upon the manufacture of carbon tissue.

Much activity appears to prevail among the societies. With the removal to a new place of meeting the Photographic Society of Great Britain seems to have turned over a new leaf with respect to the quality of the communications made to that body. Mr. Warnerke is evidently one of the most indefatigable experimentalists in the Society, and his papers, if dry to the general public, afford "food for reflection," and will be most useful for future reference. At the *South* London Photographic Society (why not drop the local appellation, seeing there is not now a *London* society?) an energetic discussion on that never-failing topic—the silver bath—formed the *piece de resistance* at the last meeting. The West Riding of Yorkshire Photographic Society is to be congratulated upon being the first at which specimens of M. Leon Vidal's polychromes have been exhibited in this country. I am aware of specimens having been shown at the Bradford meeting of the British Association, but that, after all, was not a meeting of photographers, and, moreover, it was held at *Bradford*, the same town in which the West Ridingites hold their monthly meetings. It cannot be said to redound to the credit of the metropolitan societies that they allow themselves to be thus outstripped in many matters of current interest by similar societies in the provinces. In a short time we shall, perhaps, be hearing that the latest novelty in connection with light, the *radiometer* of Mr. William Crookes, will have been exhibited and explained at one or other of the provincial societies, while the members of the London societies are reposing in a state of profound unconsciousness respecting it, or waiting patiently till some light penetrates to them from the provinces.

The new collo-developer, so recently given to the world through the pages of The British Journal of Photography, is one which the more it is tried the better it is liked. The restraining power exercised by the colloidal preparation recommended is truly astonishing, and the developer possesses this great advantage—that when used in the best proportions no extra exposure is required. The deposited metal which forms the image is beautifully fine and regular. This developer will tend to increase, if such were possible, the estimation in which Mr. M. Carey Lea is held by English photographers.

I observe that "spirit photography" has made its *debut* in Edinburgh. It is exceedingly singular that any person like the mediumistic doctor spoken of in *Notes from the North* should have arrived at the conclusian that Edinburgh photographers were so gullible as to be capable of being fooled in the way attempted by him. What could have prompted him to jump to such a conclusion? I have heard of a principal or leading member of the Edinburgh Photographic Society who has expressed an opinion—based, it is said, upon personal experience—that the Glasgow medium, Duguid, can execute in an inconceivably brief space of time oil paintings *in the dark*—mixing his colours on the palette with his eyes closed, and producing original sketches in oil colours when a sheet of brown paper was interposed between his closed eyes and the canvas! Being aware of such a belief existing among leading men in a photographic society it was doubtless natural that the doctor who acted as "medium" should imagine that he might draw somewhat considerably on the powers of credulity of lesser luminaries in "modern Athens."

THE STEEL PLATE OF THE ROLLING PRESS.

We photographers are liable to many misfortunes—mechanical, chemical, artistic, and meteorological—but I do not remember ever seeing described any of the vagaries of the steel plate of the rolling press.

It may amuse your readers if I relate a small experience in connection with this article. Some time ago I was much exercised in my mind to account for a large stain that was constantly appearing at the end of the plate (a large one, 24 × 18). It was cleaned off and the plate well polished; but in a few days there it was again, until I thought that there must be some defect in the metal to cause such constant trouble, or that some malign spiritual influence was at work. In those days photography had not yet become the fashion with the souls of our departed relatives, and an explanation which in these more enlightened days would readily suggest itself did not then occur to me. In short, the thing was wholly unaccountable on any hypothesis I could form.

So the matter remained for some time, until one morning the cause was unexpectedly revealed. Premising that in addition to photography I was at that time engaged in the interesting occupation of growing babies; a small nursemaid was engaged to assist, who was in the habit of wandering about the premises with her charge. On the eventful morning, coming suddenly into the room, I found that she had seated the child, who was what may be called full dressed as regards the legs, on the polished steel plate, with the view of imparting a new and pleasing sensation; and it must be acknowledged that he seemed to enjoy the situation. The cause of the stain was now apparent, and I need scarcely say that the nurse never earned the reward promised her if it occurred again. R. S.

OUR CHEMICALS.

No. I.

In the following short papers I purpose not so much to introduce novelties as to give slight sketches of the substances, organic and inorganic, required for the use of photographers, more or less in all studios, divested as much as possible of technicalities of description; so that those who are not read up in atomic theories and similar mysteries may more easily comprehend the "reason why" certain causes and effects every day presented to their notice take place, be able to discriminate between genuine and adulterated chemicals, and possibly get hints that will steer them clear of some difficulty or other which the absence of such knowledge would engender. In chemistry I may broadly say there is nothing uncertain. Given definite mixtures of substances, under the same conditions the results will be precisely the same. The photographer will in all probability say "everybody knows that." If they do everybody does not act according to that knowledge, or we should hear less complaints of this one's bath and the other one's developer acting abnormally and erratically as we so frequently do. Knowledge, unless brought to bear on the different and multifarious operations a photographer is called on to perform, is to all intents and purposes thrown away.

Gold.—The metals gold and silver entering so largely into our operations I will, in the first place, take these with their salts into consideration. Gold and silver were known from the most remote periods of antiquity, and both metals seem to have been in common use 3,300 years ago. The alchemists named gold "*sol*" and the "*rex metallorum.*" Silver they dubbed "Diana" or "Luna," as the king and queen of metals (fused and moulded nitrate of silver to this day retains the name of "lunar caustic"). The many valuable qualities possessed by gold makes its old name anything but inappropriate. Its resistance to the action of oxidising agents that will corrode and destroy most other metals have caused it to be largely used in the arts. Its use in photography is chiefly for toning prints, or, in other words, the substitution of it for an image already produced in silver. It is considered one of the simple elements; that is, an element that cannot be resolved into other elements, nor can other substances be combined to produce it. The non-acceptance of this fact led to that wild life's dream of the alchemists, who sought by chemical and mysterious processes to transmute other inferior metals into the much-desired gold. Although vain the quest it accidentally led to the discovery of many other useful facts, which have been of more value to the world than if they had succeeded in their search and transmutation.

As to the methods used to abstract the metal from the ore information can be obtained from any work on metallurgy, so I will not enter upon it here. The metal must be pure, which the photographer can ascertain by the following tests:—Firstly, it must be unacted upon by nitric acid alone. Secondly, it must be quite soluble in a mixture of nitric and hydrochloric acids, and wholly precipitated from its acid solution by sulphate of iron. If it bears these tests satisfactorily the sample is pure. There is, however, a small admixture of silver or copper in most samples of gold, which will remain in the solution of gold as a greenish or white residue, the greenish residue indicating copper and the white silver; but either the coin of the realm or granulated gold from the refiners is sufficiently pure for our use. To those accustomed to value these metals the plan of rubbing the specimens to be valued upon a stone, so as to grind off a small portion, and then touching this with nitric acid, will form a guide by which the value of the sample can be very closely appraised; and such is the plan usually adopted.

The chloride is the only salt of gold that is of any importance in photography, and is obtained in commerce in the form of small acicular crystals of a bright orange colour, in hermetically-sealed tubes. If only a few drachms are used in the course of a year the photographer will find it to his advantage to manufacture it himself. He will find it quite an easy and simple matter, and may proceed thus:—Take an ordinary glass tumbler and place in it three drachms of pure nitric acid, nine drachms of hydrochloric acid, and six drachms of water. Into this mixture drop half-a-sovereign, cover the glass loosely with paper to keep the dust out, and set it on the hob, interposing a piece of wood between the glass and hob to guard against fracture; in a short time the half-sovereign will be found dissolved. It may be stirred with a small strip of glass from time to time to hasten the solution. When this takes place remove from the heat and add, *very gradually*, prepared chalk till all effervescence ceases, and a quantity of the chalk remains at the bottom of the glass. This must be carefully done, or a violent effervescence will cause the solution to be projected from the glass and wasted. The quantity of chalk is immaterial so long as sufficient is used, the overplus being readily filtered out. When no more bubbles arise set the whole aside for a few hours; then pour it into a filter, adding sufficient water to make up half-a-pint. It is advisable to let the strong or slightly-diluted solution filter through first, adding water little by little, which will, if properly managed, entirely exhaust the sediment of chalk and filter-paper of all traces of gold. The last water passing through the filter will be perfectly colourless, and any waste will thus be avoided.

The solution of chloride of gold is now ready for use, and will contain about a grain in every drachm of liquid, retaining a *slightly* acid reaction—just sufficient to prevent the precipitation of the gold from the solution by keeping, and suitable for any of the toning baths in general use. Gold so prepared will be found to tone more than that usually purchased.

Toning silver prints is almost the only use to which photographers put this salt; it is, however, occasionally used for intensifying negatives, but other substances will generally be found to answer this purpose better. It can also be used for gilding metals, such as iron or steel, upon which it is reduced, if they are placed in its solution. Silk, leather, glass, and other materials may be beautifully gilded, and as occasions might arise where photographers could utilise this I append directions for so doing. Make a strong solution of the chloride in water (if an ethereal solution was used the gold would be reduced in the after-processes as a purple powder), and dip the substance to be gilded into it. Whilst still damp submit them a few minutes to the action of phosphuretted hydrogen gas, and directly afterwards to the fumes of a solution of sulphurous acid gas in water; in a few minutes the gold will be revived as a brilliant metallic coating adher-

ing very firmly to the articles treated. Any amount of gold may be deposited upon them by repeating the process. On removal from the fumes of the sulphurous acid they should be dipped in water and dried; they will now bear polishing with a leather and rouge. *Very* delicate substances are better treated with a solution of the chloride in oil of lavender, otherwise proceeding in the manner already directed.

To test the purity of chloride of gold, it should be removed entirely from the watery solution by rectified ether. Whatever is left in the watery solution is foreign matter, the nature of which is readily ascertainable, and will, in all probability, be a salt of either potash or soda. The crystals must be dry.

SILVER.—Silver is the most important metal with which photographers have to deal, possessing as it does many of the qualities of gold, being at the same time less costly. In the metallic state it is most suitable for dippers, vessels, or apparatus that may be brought into contact with its nitrate. Its purity is ascertained by its entire solution in nitric acid, from which solution it is entirely precipitated by common salt. This precipitate is completely soluble in liquid ammonia, the remaining fluid being unaffected if sulphuretted hydrogen gas be passed through it. In case of being alloyed with other metals, the action of this gas would cause them to be precipitated as dark or light powders—sulphurets of the respective metals employed for sophistication.

The preparations of silver with which photographers are most likely to be acquainted are the oxide, nitrate, chloride, and sulphide, not taking into account the different salts formed by the reaction of the nitrate upon the iodides, bromides, chlorides, &c., of other metals and metalloids with which it may be brought into contact. Oxide of silver is principally used as an agent to neutralise acid solutions of nitrate of silver. It should be used freshly made, for if exposed to the continued action of light it becomes reduced to a metallic state, and is consequently useless for this purpose. The change from the state of oxide to a metallic one might remain unnoticed by the photographer, who would only discover his bath not improved by the addition or the acidity remedied. It may be readily made by adding a little potash or ammonia to a solution of nitrate of silver and collecting the precipitate, which is oxide. The demand for this preparation being limited it is rarely adulterated. Tests applicable to the metal are also applicable to this oxide.

Nitrate of silver—the most important of all silver salts—is in large demand, being generally purchased from the chemist or refiner, and, as a rule, may be relied on for purity if purchased from a respectable dealer. A simple solution of the metal in dilute nitric acid poduces it, from which it is obtained by evaporation and crystallisation. Redissolving in distilled water and crystallising several times repeated removes the free acid, and forms the neutral recrystallised nitrate of commerce. The ordinary nitrate usually contains free acid, and is almost invariably used for the paper sensitising bath. It may, however, be as well to know how to detect adulterations in case of a suspected sample. The most probable adulterant is nitrate of potash. The qualities of the pure silver salt are—it is crystalline, colourless, and entirely soluble in distilled water. The watery solution from which the silver has been thrown down by hydrochloric acid should contain *no* residue whatever, and be entirely volatilised by heat; if any residuum be obtained it shows the nitrate was adulterated. A little of the solution placed in a watch glass and held over a spirit lamp will quickly determine this.

The two purposes for which this salt is most largely consumed are for the manufacture of the negative bath and printing bath. The purpose of this paper not being so much to instruct in manipulative photography as to treat of the substances employed in those manipulations, I shall not, as a rule, deviate from this intention. The negative nitrate bath, however, being such an important matter, I will give a formula for its compounding that I have invariably found give good results. It is this:—Into eighty ounces of good water (distilled water is not essential) put five ounces troy of nitrate of silver. When dissolved add six drachms of iodised collodion of such kind as is intended for use with it afterwards. Shake up well; then set in the sun for a few days until the dark precipitate that will be formed is thoroughly settled, filter, and test for acidity. If found neutral a few drops of nitric acid must be added to impart the required acidity. It is now in good condition for work, and will, with occasional strengthening, remain so for a long time. The addition of a small quantity of nitrate of barytes, as recommended by Mr. A. L. Henderson—but not more than two or three grains to the ounce—is an advantage *if* the negatives therein prepared are intended to be varnished; *if not* (as in the case of transparencies) the barium salt is better left out, as it produces a veil that is very unpleasant in an unvarnished transparency.

E. DUNMORE.

FOREIGN NOTES AND NEWS.

EXHIBITION AT UTRECHT.—CEMENT FOR GLASS, &c.—THE BERLIN PHOTOGRAPHIC ASSISTANTS' ASSOCIATION.—THE *MITTHEILUNGEN* ON MR. WARNERKE ON EMULSION COLLODION.—HEINE'S GUM AND COFFEE PROCESS.—HOW TO REVERSE NEGATIVE AND POSITIVE FILMS; DR. VOGEL'S METHOD.—HERR BACHRICH'S NOTES ON SILVER PRINTING.—A PHOTOGRAPHIC DINNER.

THERE is to be an exhibition at Utrecht in August and September, and from the fact of notice having been sent to the Photographic Society of Berlin we conclude that it is to be a photographic exhibition, or, at least, that there will be a photographic department.

Herr Oppermann, of Gladbach, gives the following receipt for a cement for glass, porcelain, &c., which, though not exactly new, may be unknown to some of our readers:—Unslaked lime and cheese whey are mixed in equal parts. Apply the mixture to the broken edges, fit them together, and leave them to dry spontaneously. Silver baths had better receive a coat of melted shellac after the cement dries. The cement is said to be very durable and to withstand even boiling water.

The *Vossische Zeitung* mentions the foundation, on the 1st of March, of a society to be called the Berlin Photographic Assistants' Association. This society is intended to be in union with all the other photographic assistants' societies in Germany. Its objects are to promote the cultivation of photographic art by means of essays, debates, &c.; the formation of a sick fund; the amelioration of the condition of its members, &c.

Mr. Leon Warnerke's investigations relative to the emulsion collodion is reproduced in this month's *Mittheilungen*, the editor, in a foot-note, giving an explanation of the peculiar behaviour of the iron emulsion before the addition of *aqua regia.* At the foot of page 88 of this Journal Mr. Warnerke says:—"The behaviour of iron was quite exceptional; before the *aqua regia* was added the emulsion, white in the first instance, blackened suddenly. I expected that nitrate of iron would reduce the bromide of silver; but I supposed that this would occur only in the presence of actinic light. Experiment proved otherwise. To remedy the evil I added *aqua regia* till the emulsion whitened again; but this quantity (forty minims per five ounces) made excess of haloids instead of silver." The foot-note in the *Mittheilungen* runs as follows:—"The blackening is easily explained by the reducing action of the silver salt upon the NO_2 of the pyroxyline and the formation of a compound which turns black on becoming dissolved in the bromide of iron. There can be no question of a reduction of the bromide of silver by the nitrate of iron."

The *Correspondenz* gives the following as Herr Thos. Heine's gum and coffee dry process:—Well-dried plates are coated with albumen to which a little ammonia had been added. After being collodionised they should be sensitised for four minutes in an eight-per-cent. silver bath and then washed. The preservative consists of two fluids—

I.

Boiling water	165 c. c.
Mocha coffee	15 grammes.
White sugar	6 ,,

II.

Distilled water	165 c. c.
Gum arabic	6 grammes.
Candy sugar	1 to 3 ,,

When the boiling coffee mixture has cooled both liquids are filtered, after which they are mixed. The mixture is light brown in colour, and remains in working order for some days. The plates are coated with it twice, as with ordinary collodion, and left to drip and dry. After being exposed they are laid for four minutes in water; then pour some water containing from six to ten drops of a saturated solution of carbonate of ammonia upon the plate, which is held in a horizontal position. If the plate has been properly exposed the development now begins, the lights becoming visible. As soon as this action ceases a few drops of an alcoholic solution of pyrogallic acid (one part of pyrogallic acid to five parts of alcohol) is added. The whole picture then appears, but as it is only visible by reflected light it is again washed, and coated with the following solution:—

Water	120 c. c.
Sulphate of protoxide of iron	3 grammes.
,, oxide of copper	3 ,,
Citric acid	3 ,,

It is occasionally necessary to strengthen with pyrogallic acid and nitrate of silver; then follows the fixing with hyposulphite of soda.

These plates require an exposure of about three times the length of ordinary wet ones.

In an article upon carbon negatives, which we cannot refrain from quoting, Dr. Vogel says he has already pointed out in his book on the carbon process how much that process is simplified when one has to deal with reversed negatives, and how to produce these negatives upon a paper support; but, unfortunately, the surface of the paper is scarcely fine enough for this purpose, nor does it allow of the gelatine film being intensified. He observes:—"The end may be much more quickly and certainly reached by the following process:—A transparency is taken and developed upon washed and collodionised glass and allowed to dry. When dry, Grüne's tough collodion—

Paper collodion	2 parts,
Alcohol	50 ,,
Ether	50 ,,
Castor oil	1 part,

is poured over the whole until rather a thick film is formed; and when the collodion has set the plate is dipped into cold water. After about half-an-hour the edge of the film may be carefully loosened with the fingers. It then slides off easily when placed under water. This operation succeeds best in a dish twice the size of the plate. One draws off the picture film and leaves it in an inverted position in the water, turns round the sheet of glass—the unwaxed side comes uppermost—and pushes it under the picture film. Then, making two corners of the film even with those of the sheet of glass, one raises the whole out of the water, taking care to avoid air-bubbles. The film quickly becomes flat, and in drying sticks fast of itself. Varnish is unnecessary. If the film be laid in water again it can easily be brought into its normal position with the help of a brush. A reversed transparency obtained in this way, when copied upon carbon paper, furnishes in its turn a reversed negative. If one does not wish to draw the picture film on to the glass, but to preserve it as it is, in order to be able to print from either side, it is advisable to coat it before collodionising with a one-per-cent. solution of caoutchouc in benzine, and then with the collodion. The film floated off in water is then dried between sheets of fine blotting-paper." Rather a ticklish operation that — the reversing of the film in the water!

In the *Correspondenz* Herr Leopold Bachrich continues his remarks on silver printing, in the course of which he impresses on his readers that there are two practices that printers are prone to indulge in which have an injurious effect on the results of their labours. The first of these bad habits is that of using baths of too various temperatures, and throwing the prints suddenly from the one into the other. Thus the gold bath, in order to produce rapidity of toning, is generally kept rather warm, while the soda into which the prints are transferred, and the washing water are, in winter at anyrate, generally exceedingly cold. The remedy he recommends for this state of matters is obvious; it is to equalise the temperature by slightly warming the hypo. and washing water and reducing the temperature of the gold bath, to which gold is added to bring up the rapidity of toning to its former standard. Of course the soda and washing water must merely have the *excessive chill* taken off, for fear of yellowing the browns. The other mistake he considers frequently made is that of using different makers' paper. He has often found that the chemicals and treatment which suited one make of paper gave but indifferent results when applied to another equally good paper. He is therefore inclined to believe, without denying that absolutely worthless paper sometimes finds its way into the market, that this is the reason why it sometimes happens that one man gets excellent results with a paper, while another, equally skilful, gets bad results with the same paper. Herr Bachrich's advice to printers may, therefore, be briefly summed up in four words—*Stick to one paper!* His advice seems sound. Having found a paper which suits your chemicals and mode of manipulation stick to it as long as it continues to suit you, and do not be always trying new sorts for the sake of variety. There is a great deal too much running after novelty for the mere sake of novelty. But the business is first to get the suitable paper which shall always be good. Perhaps the paper manufacturers would be inclined to think that, as far as many photographic printers are concerned, the old proverb, "The bad workman always complains of his tools," is very applicable. But let us return to our *moutons*, as the French say, which at present are not old saws nor paper manufacturers, but Herr Bachrich's remarks on printers and printing. Another point on which he touches in his interesting article is those minute blisters which sometimes rise all over the surface of prints in the course of washing and disappear again when they are dried, having done no great harm, but which, when the prints are left to soak too long in the water, are apt to become discoloured and to show as bluish marks, rendering the prints worthless. He animadverts strongly on the folly of photographers who court this evil by mistaken economy in using weakly-albumenised paper. Herr Bachrich is evidently amongst those comparatively few photographers who pay personal attention to the printing of their photographs in all its details.

The *Chambre Syndicale* of Paris held a reunion of a festive character on the 7th ult., twenty-one members being present. M. Truchelut, during dessert, instead of proposing a toast explained the reason of their meeting upon that occasion. He remarked that photographers, as a rule, lived too isolated a life, and had but few opportunities of meeting one another in a social manner. In an able speech M. Truchelut proposed that the meeting should form the first of a series to be held at regular and fixed intervals—a proposition warmly received by his hearers, who, before separating, had fixed the date of the next meeting.

Meetings of Societies.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.

At the meeting of this Society held on Tuesday last Mr. Glaisher, President, occupied the chair.

Messrs. W. F. Henry, Ernest Soutter, and C. A. Woolnough were elected members.

Mr. John Spiller read a paper *On a New Method of Photography.* [See our leading article on the subject.]

Mr. England inquired if the action of the antimoniated hydrogen upon the sulphurised paper during exposure was not that of a developer rather than a sensitiser.

Mr. Spiller replied that sulphur not being sensitive to light was not acted upon by it; the gas, therefore, was a sensitiser and not a developer.

Mr. Friswell said that it was an instance of a kind of reaction well known in chemistry, in which bodies that were mixed in the dark might remain in that state without chemical union taking place until brought into the light. The mixture of equal parts of chlorine and hydrogen afforded an example of such a union; when these were mixed in a feeble light and brought into the sunshine or other powerful light chemical combination was instantaneously affected, accompanied by an explosion. He warned those who might feel inclined to try the production of photographs by the process described by Mr. Spiller that antimoniated hydrogen was exceedingly poisonous, although it was so in a much less degree than arseniuretted hydrogen, which was one of the most poisonous substances known, a single cubic inch causing death in fifteen minutes.

Mr. J. R. Sawyer inquired if a latent image were formed upon the paper which might be developed afterwards, for he anticipated a certain amount of difficulty in applying the gas to paper during the time it was locked up in the printing-frame; but——

Mr. Spiller assured Mr. Sawyer that with a felt pad behind the paper no difficulty would be experienced. There was no latent image formed capable of being afterwards developed, as in Talbotype; the formation of the image proceeded measure for measure with the amount of light to which the paper was subjected, and the action did not go on in the dark.

Mr. W. S. Bird inquired whether or not gradation of tone could be obtained.

Mr. Spiller said it could, and referred to the specimens which were being handed round the room.

Mr. T. Sebastian Davis wished to know if a prolonged exposure to diffused daylight had the same effect as sunlight.

Mr. Spiller: Yes.

Mr. Whitfield thought that, as the antimoniated hydrogen was applied at the back of the paper, the necessarily unequal degrees of thickness of the paper would cause inequality in the transfusion of the gas.

Mr. W. T. Wilkinson said a case in point was the fuming of sensitive paper by means of pads impregnated with ammonia and placed behind the paper. There was no inequality in the results when pictures were printed in the latter way.

Mr. J. A. Spencer had observed in one of the specimens that the sulphur was deposited on the paper in the form of large crystals. He suggested, as a much better mode of charging the paper with sulphur, that it be saturated with a solution of hyposulphite of soda and then treated with acid.

Mr. Friswell thought that the process might be useful to travellers as a means of enabling them to bring home copies of plants and leaves obtained by superposition.

Mr. Francis Bedford suggested that this might be more conveniently done by means of the permanent sensitised paper so easily procurable.

So far as he could perceive there was no half-tone in the prints exhibited, and he did not see that the process was ever likely to be of much use.

Mr. G. Hooper said that the large attendance that evening proved that the members were not remiss in attending the meetings of the Society when they expected to hear any subject connected with a new process brought forward, and it showed their desire to get some other process than either silver or carbon printing. The latter, in his estimation, had, after a trial of fourteen years, proved inadequate to the wants of photographers, and he hoped at the June meeting to bring forward a process of printing on plain paper which would prove generally acceptable. The speaker then, amid some confusion and laughter, began to attack carbon printing in a very forcible manner, but was called to order by

The Chairman, who thought that Mr. Hooper was wandering from the subject before that meeting. The method of printing introduced to their notice by Mr. Spiller was novel and possessed much scientific interest; and in tendering that gentleman their thanks he trusted he would keep his eye upon the process.

Some illustrated works by Mr. Whitfield, and pictures designed and coloured by Mrs. Payne, were exhibited at the close of the proceedings.

The next meeting of the Society will be held on the 9th of May.

GLASGOW PHOTOGRAPHIC ASSOCIATION.

A meeting of this Association was held on the evening of the 29th ult., at the Religious Institution Rooms,—Mr. John Stuart in the chair.

The minutes were read and approved. There were fourteen gentlemen admitted as members, making the number of members sixty-one.

Mr. Gilfillan inquired if any member could inform him how to transfer photographs to stoneware or common delf. Several methods were suggested, and reference was made to Mr. A. L. Henderson's process.

Mr. Mactear laid on the table a number of prints of Dallastint, and a large number of carbon prints were shown by Messrs. J. Paton (Greenock), J. Rae (Dumfries), A. Sachs (Bradford), J. Henderson (Perth), R. Brinkley (Glasgow), T. Annan (Glasgow), and J. Bowman (Glasgow).

The adjourned discussion was then commenced by Mr. R. T. Dodd, who said his only object in moving the adjournment of the debate on carbon tissue and patents was that it might be more exhaustively discussed by the members, as it seemed at present the most interesting question connected with photography. Recently Johnson's double transfer process with collodion had been introduced under a new name and with an improved tissue, and although the results were very beautiful, yet from the difficulty of the manipulation, expense of material, and the wholesale use of chemicals, it was the most deleterious to health of all processes used in photography. It would not, he thought, ever become generally used. He (Mr. Dodd) was inclined rather to look for an improvement in the single transfer process as the future hope of pigment printing, and the present practice of the Autotype Company confirmed that idea, as he found on visiting their works last month they were working that process exclusively. He thought that possibly by improvements in the transfer paper they might get prints as good as they now did on opal glass, and those left little to be desired. Swan's patent, as Mr. Urie had informed them, would expire in less than two years, and he suggested that any application for its extension should be opposed by the profession. At present the Autotype Company were making an effort to retain their monopoly by getting their licensees to sign an agreement to purchase all their tissue from them during the whole term of their patent for minor improvements, which may hold them in their power for many years to come. He did not mean to decry the merits of Mr. Swan's labours, but the carbon process was the outcome of many minds, and this patent stayed all progress in carbon printing outside of one establishment. Had the late Mr. Blair, of Perth, patented his discovery in 1859 Mr. Swan's patent in 1864 would, he thought, have been impossible. He referred to Mr. Blair's discovery of exposing from the back, on which half-tone in pigment printing is based. He was glad to be able to show some of Mr. Blair's pictures, and he thought the members would agree with him that they were not far behind those produced at the present time. Those were done without transfer, by making them temporarily transparent and exposing with the back next the negative. He also showed some pictures on tissue made by Mr. J. A. Spencer, of London, in 1870, when he at that time successfully opposed the Autotype Company. He (Mr. Dodd) also brought some prints from the same negatives to illustrate an advantage which silver prints had over carbon. The distinction was that carbon prints gave the gradations of light and shadow all in one tint. The silver prints had gradation of colour as well, from warm in the deepest shades to cool colour in the lights. That—especially in landscape work—gave a more pleasing and truer rendering of nature. In his opinion pigment printing, though its full development had been stunted by patent restrictions, had still much power of growth; at any rate, they should practice it as a means to remove the stigma of instability from their art.

Mr. John Spencer said Mr. Urie's paper showed clearly that many inventors had produced results so far satisfactory, and had comprehended the principles by which the desired end was to be attained many years since. Still, of the numerous patents nearly all were practically a "dead letter" so far as their adoption by photographers was concerned, few having even attempted to work them. Nor did the majority of the inventors show such confidence as to risk the introduction or doing so, the public—that is, the photographers—did not take hold of them. It was left for M. Lambert to set carbon printing before his brother photographers in such a form and capable of such results as to induce many in all parts of Europe to pay him for the right to use his method. He thought all would agree with him that it would have been impossible to show such specimens (obtained not from the patentee but from his pupils) before M. Lambert appeared on the field, and on the principle of judging by results he held that M. Lambert deserved credit for what he had enabled others to do. As to the validity of M. Lambert's or any previous patent he offered no opinion, but would simply say that if nothing new was contained in his process, and the same means were described in older patents which had now lapsed, it was of course open to any one to adopt them. But even supposing they succeeded in producing results equal to the specimens shown, it would not, in his opinion, detract from the credit due to M. Lambert; for he was the person who first really did such work, and enabled photographers to make small carbon pictures equal in appearance to the best silver prints, and those not as curiosities but for regular daily work. No doubt there remained some difficulties, but it must be remembered the present excellence in silver printing had only been attained by many years' work, and it was only reasonable to suppose that practice would speedily show how to overcome any present annoyance. In conclusion he would say that in discussing the comparative merits of one process as compared with another the personal element should be left out, and their respective values only be taken into consideration.

Mr. G. Mason observed that undoubtedly M. Lambert had given a great impetus to carbon printing.

Mr. Dodd said it was astonishing that M. Lambert in his chromotype patent claimed nothing in carbon printing.

The Chairman said he was one of the first licensees M. Lambert had in the country. M. Lambert said to him—"You may read the patents, but unless you go down stairs and see me work it will do you no good." But, patent or no patent, he considered the process worth the money, with the lesson and the use of superior tissue. He did not believe there was a valid patent for making tissue. If he was correct any one might make and sell it. He held that carbon pictures were superior to silver prints in tone, and that was the case even with the pictures Mr. Dodd had shown.

Mr. Gilfillan thought carbon prints were far superior to silver ones.

Mr. Stuart and Mr. Dodd both complained that some kinds of transfer paper and also some tissue were very bad.

Mr. Turnbull said M. Lambert had done more than any other man to raise the status of photography.

Mr. Urie laid on the table several full-plate and card prints which, he said, were from tissue made by himself and with the formula he had given in his paper.

The Chairman said he would advise Mr. Urie to manufacture tissue for the trade, as they were certainly the best tissue effects he had seen.

Mr. Dodd said they were by far the best carbon pictures he had ever seen.

Mr. Urie said he would make some tissue for the members to try, but he had no desire for a lawsuit and would not manufacture for sale, although he was confident he had the right to do so. To contest a patent was a serious job.

Mr. Urie gave notice of motion that a small committee be appointed to watch that a renewal be not granted for Mr. Swan's patent.

The Chairman moved a vote of thanks to those who had sent pictures, and to Mr. Dodd and Mr. Spencer for leading the debate.

These were heartily awarded, and the meeting was then adjourned.

VIENNA PHOTOGRAPHIC SOCIETY.

At the last meeting of the above Society a picture of the Palais de Justice at Brussels, taken by Herr Blochouse, was shown, as was also a collection of lichtdrucks, after Führich's drawings, sent by Herr Märkl for the Society's travelling album.

Dr. Székely called attention to a printing-frame which admitted of eight *cartes-de-visite* being printed from one negative, upon a single sheet of carbon paper, without the frame requiring to be opened, and showed a sheet of paper on which eight copies of a negative were printed in this way. (From what we can understand of the description the negative was slid along a groove.)

Herr G. Märkl, Jun., gave a demonstration of the carbon process, with previously-prepared tissue, which was followed with great attention by all present.

A written inquiry as to the employment and reliableness of W. B. Dick's *extincteur* was then handed in, in reply to which the patentee's representative said that a salt was mixed with the water ejected by the apparatus, which by diluting the water furnished a sort of screen against the air, and which evolved a gas which hindered the spread of the flames. In a discussion as to the best means of protecting photographic laboratories and studios from fire, the President said that, though photographers should take every precaution considered necessary in other establishments where easily-kindled and combustible

materials are stored, he did not think that any further precautions were peculiarly required for photographers.

The question—"Does anyone know the so-called Charlottype process, which is announced as a new invention by a Vienna firm?" gave rise to a long and lively discussion, in the course of which

Herr LUCKHARDT said that the advertisement of the firm in the daily papers would be apt to mislead the public, though it was well known to professional men that the art of reproducing the natural colours by photography had not yet been attained. He held it to be their duty to make it known that the meaning of the advertisement was not that a new process had been discovered, but that it was merely a business reclamation. It was, however, worded so that many would suppose that they would now be able to get portraits coloured photographically from life, and that the process after which professional photographers and scientific men had alike been long striving was at length discovered.

Herr TSCHOPP said that, long ago, a certain Herr Schonwald had taught a process by which the natural colours were brought out in the gold bath. It consisted of covering certain parts of the print with liquids, the colours of which did not change again in the gold and fixing baths.

Herr RUPPRECHT observed that he had known of a similar process for about ten years, and that he still possessed the liquids required for the various tones.

The discussion was soon after finished, and with that the proceedings were also terminated.

BERLIN PHOTOGRAPHIC SOCIETY.

AT a recent meeting of this Society the album which Herr Remelé had prepared to send to the Philadelphia exhibition, and which contained his views in the Sahara, was shown, as were also a number of carbon enlargements by Messrs. Spencer, Sawyer, Bird and Co. from negatives by Herr Reichard. Mr. Sawyer had intended taking the necessary transparencies in the course of his stay in Berlin, but was prevented by the dullness of the weather; so he took the negatives to London with him. On being compared with the original pictures the enlargements appeared scarcely so soft, but that might have been owing to their cold, greyish-blue tone.

The rules for the widows' fund, promised by Herr Züllmer, were then laid upon the table. They were rather voluminous, consisting of twenty-nine paragraphs; but Herr Züllmer explained that they could scarcely be curtailed if all the police regulations were to be complied with.

The PRESIDENT suggested as an alternative that a plan similar to that of the Berlin Press Association be adopted, which is that on the death of a member of the association each surviving member should pay three marks (shillings) to the family of the deceased. Both proposals were remitted to the widows' fund committee for further consideration.

AT a subsequent meeting Herr Warnerke's article in THE BRITISH JOURNAL OF PHOTOGRAPHY of the 25th February, on *Investigations Relative to the Emulsion Collodion*, was discussed.

Dr. WEISSENBORN was agreeably astonished at the use of gelatine as therein described. For the dry process the collodion should be prepared with strong acids and kept at a higher temperature in order to increase its action; and in the article in question stress was laid upon this, but then the gelatine must undoubtedly lessen the action of the acid.

Herr PRÜMM differed in the opinion as to the effect of the gelatine, the idea that it serves to make the film denser not being new to him. Should this view of the matter be confirmed he thought it would be advisable to add a certain quantity to the ordinary collodion when required to increase its density, instead of keeping a reserve collodion prepared with it.

Dr. WEISSENBORN promised to lay some cotton prepared in this way before the Society.

A passage from a letter from Herr Oppermann, of Gladbach, was then read, in which he said he had been induced to send a specimen of the work produced by Herr Hommel's as yet secret plastographic process, in consequence of having read the remarks made about it at the last meeting of the Society. [See report at page 131.] The specimen enclosed was done by Herr Hommel from one of Herr Oppermann's negatives, and was accompanied by an ordinary print from the same negative.

After having examined the specimens the members saw no occasion to alter their opinion as expressed at the former meeting, namely, that the effect, in whatever way it was produced, was similar to what is known as "Denier's effects."

At the request of several provincial members, it was resolved to secure the portraits of all the members of the Society, and to arrange them as a group. The undertaking was intrusted to Herr Marowsky.

A discussion followed as to whether photographic show-cases should not be closed during the hours of public worship on Sundays. One member contended that as the pictures in the show-cases were not saleable there was no occasion for removing them. Another member contended that those in Berlin should be closed, since in some provincial places the police fined those who left them open at those hours.

A letter was then read from Herr Kothe, of Cassel, in which he said he had tried Herren Eder and Tóth's method of intensification with lead upon reproductions of drawings in pencil, and found it very simple; but every time, at the end of the intensification, innumerable rents and pinholes showed themselves in the collodion, so that he had to have recourse finally to intensification with iodine mercury, which gave good results with the same collodion. He inquired if any one else had tried the process, and, if so, whether any one had met with those rents and how they could be prevented, as otherwise he was much pleased both with the equality and density of the deposits obtained by the process. Unfortunately, however, as no one present had tried the process in question they could not help him, but Dr. Vogel suggested a substratum of albumen or gutta-percha.

At the meeting of this Society reported on at page 94 of THE BRITISH JOURNAL OF PHOTOGRAPHY Dr. Vogel asked for information as to the process by which cetrain printing plates in use at the State Printing Establishment were produced from negatives, and as yet he seemed to have received but one reply, viz., a letter from Herr Hans Brand, who offered to let Dr. Vogel examine one of his negatives. In one particular at least Herr Brand's printing plates differ from those about which Dr. Vogel inquired—the former are easily injured, while more than one hundred impressions can be pulled from the latter, whose appearance, it will be remembered, differed in no way from an ordinary unvarnished negative. But as Dr. Vogel intends to have some further correspondence with Herr Brand we shall likely hear more of these processes.

Herren Talbot and Schaarwächter showed a number of carbon transparencies.

Dr. WEISSENBORN said he at first had great difficulty in getting his pictures off the glass by double transfer, as some part was sure to stick, even though he had coated the surface of the glass with wax; but now he polished the glass with talc instead, and cleaned it off perfectly before pouring on the collodion, so that the pictures came off quite freely.

With these remarks the proceedings terminated.

Correspondence.

EMULSION EXPERIMENTS.

To the EDITORS.

GENTLEMEN,—I notice that Mr. L. Warnerke has experienced the same effect of the splitting of the collodion film when using ethyl-bromide that I have in my trials of the chloriodo-bromide process. Is it possible that methylated solvents, acted on by the acids, can be the cause of this change in the nature of the film in my case? I believe that it is considered prejudicial to an ordinary collodion to use methylated ether with cadmium salts, though in what way the collodion is affected I am ignorant.

I have tried the chloriodo-bromide process with gelatine under as nearly as possible identical conditions with those of Mr. M. Carey Lea. To make an ounce of emulsion I took ten grains of gum arabic and Mr. Lea's proportions of bromides and iodides, and dissolved them in three drachms of water, added the *aqua regia*, and sensitised with twenty-five grains of fused silver nitrate dissolved in two drachms of water. In a little over half-an-hour the cobalt chloride was added in one drachm of water, and, at the end of eighteen hours, ten drops of the acid (Lea) solution of albumen and a grain each of gallic acid and grape sugar, followed by twenty grains of gelatine. After about an hour the gelatine was dissolved by heat and the emulsion poured out and washed. A plate coated with the resulting emulsion was tested against a "Kennett" plate; the two plates were developed together by Mr. Kennett's formula, using half the quantity of bromide, and the "Kennett" plate most decidedly was by far the best exposed, though both plates were purposely under-exposed. Now the "Kennett" pellicle is prepared with soluble bromide in excess, and yet the chloriodo-bromide emulsion, prepared with free nitrate in excess, was the slower of the two. This fact rather bears out my former experience of the process when using collodion, the resulting emulsion proving somewhat slower than an emulsion prepared with soluble bromide in excess.

It was my intention to have satisfied myself as to the relative sensitiveness of the above emulsion and of another prepared without iodide, but with sufficient extra bromide of ammonium to convert the same amount of silver. To this end I have made an emulsion in every respect in the same manner as the last, with the exception of the iodide.

However, there is a screw loose somewhere this time, the emulsion not being satisfactory as to its mechanical state, though it seemed to be right in this respect before pouring out to wash. I must, therefore, make a fresh beginning.

In a sub-leader you remark that "F. S. K." does not use any restraining acid before adding the pyro. and gallic acid solution. From what experience I have had I agree with yourselves; that is, if free nitrate be present in sufficient quantity to be reduced. My experience is that it does not do even to let nitrate of silver act on the gelatine, even though it be afterwards converted by bromide in excess, the

gelatine becoming of a transparent red colour on development. Again: in the foregoing chloro-bromide emulsion the gallic acid and glucose were added to the emulsion, acid with nitric and acetic acids, and the bottle was well shaken; yet—I presume from the gallic acid having been added in the solid state—after standing there was a little black deposit in the angle of the bottom of the bottle.

For my part I am agreeably surprised to find that it is possible to use free nitrate in excess whether restrained or not, since, if such excess really influences the character of the bromide of silver, and not merely the pyroxyline in the collodion processes, increased rapidity should result from its use.

It is generally considered that there is a fault, I think I may say, inherent in gelatine emulsions, viz., that of want of density. I believe this fault will be found not to be confined to gelatine, and that it may be explained by reference to the behaviour of the better-known collodion emulsions when made with free haloids in excess. We know that a collodion emulsion thus made, and having *all* the free haloids washed out, is liable to give a thin, foggy image; but, if the film contain free haloids, or if it be soaked in a solution of a bromide before development, the image will be dense and clear. Now the same principle applies to the gelatine emulsion, for it will be seen that the shreds of gelatine are generally well washed, by which they are freed from all soluble haloids, and the resulting pellicle will be prone to give thin, foggy images. The addition of a little free bromide will remedy this defect, though at the expense of sensitiveness.

In a recent article *On Restrainers* the writer expresses his opinion that gelatine emulsions are as subject to fogging as collodion ones. To me this does not seem to be the case, as a clear, dense negative may often be obtained with at least a minimum of free bromide, which would not be the case were collodion employed under the same conditions and without a preservative. Also, I have found gelatine to have a remarkable power of restraining fog in silver chloride, the gelatine being used as the vehicle for forming the film, as in gelatino-bromide. I believe this restraining property of gelatine enables us to include the well-known rapidity and fair density—the latter partly caused by the *colour* of the reduced silver—in the same plate.

The writer, also, has some doubts as to soluble bromide being a restrainer proper, and suggests that it is rather a destroyer. But, if this be the case, how are we to account for increased density of the image in the plate containing it? If the action were merely that of a destroyer the utmost good that could result from its use would be a greater clearness of the shadows, not density of the lights.* Doubtless it is a destroyer, but, also, I think, a restrainer; and, for the former reason, it would be well to use a powerful restrainer having no deleterious action on the latent image. Probably a soluble chloride would be better than a bromide; but an organic substance would most likely be better than either.

There is a possible good effect a soluble haloid may sometimes have as a destroyer, viz., that of destroying the effect of any chance slight reflections of light from the sides of the camera, &c., which would mar the brilliancy of the negative.

I notice that the writer of the article referred to, if the same person, seems to contradict himself as to gelatine being a restrainer, for at the end of the second paragraph, page 121, he says:—"Gelatine we look upon as a fog restrainer;" but in the fourth paragraph of the article *On Restrainers*, page 135, this property is not claimed for gelatine. Perhaps the writer may not be identical in the cases above quoted; but, should he be, I well know that it is exceedingly difficult to avoid occasionally contradicting in effect one's former statements when looking at a subject from a different point of view. It has been said of a certain branch of criticism that a man's opinion is not worth having until he has changed that opinion several times. I think this saying may apply to opinions on some of the scientific aspects of photography.

It appears from Mr. L. Warnerke's experiments that the nitrates of calcium, lithium, and strontium may be added to that of uranium, as possessing the property of restraining the foggy effects of silver in excess. I also notice that a parallel may be drawn between these experiments and some published on the sensitiveness and behaviour of different chlorides by Mr. W. H. Harrison, at page 471 of the Journal for 1872. Mr. Harrison found barium and strontium to be the most sensitive of chlorides tried. However, on referring to this paper, it will be noticed that the proportions of salts and time of floating are rather too uniform, considering the different combining proportions of the chlorides and their varying affinities for silver nitrate; that is, applying Colonel Stuart Wortley's results with the bromides to the chlorides.

It is also remarkable that copper has given the greatest intensity, as chloride of copper has been much in use lately as an agent for the obtaining of increased density. It has been stated that chloride of calcium does not destroy the latent image or retard its formation in the same way as other chlorides, and bromide of calcium has been proved to be in the front rank as regards sensitiveness; but I feel I am rather "twisting facts" to suit an argument.

In my last letter I had intended to write that I wished "it could be *proved* that chlorine had a greater affinity for silver than bromine." However, on second thought, I rather doubt whether "matters *would* be simplified;" for how should we account for chloride of silver having the greatest affinity of the haloid salts of silver for hydrogen? If chlorine *has* the greatest affinity for silver, why is it so easily reduced? On the other hand, its greater affinity for silver would, perhaps, account for the inferior (?) sensitiveness of chloride of silver. Still there is no doubt that it is easily reduced, even if unexposed to light, and the latent image, if present, should, therefore, also be amenable to the same energetic action, but this does not seem to be the case; and I can only draw this conclusion, viz., that the latent image is probably not impressed in so short a time as is the case with bromide of silver, owing, as I believe, to a comparative indifference of the chloride to the less refrangible rays; at any rate, for some cause or other, the powerfully-acting developer fails to render visible any action of light.

It is my intention to try the effect of silver nitrate in excess in a gelatino-chloride emulsion, hoping that the silver chloride may be modified by its action.—I am, yours, &c., HERBERT B. BERKELEY.

Cotheridge Court, Worcester, April 3, 1876.

* It may be said that a soluble bromide, as a destroyer, gives density by destroying the effect of any *excessive action* of light, or solarisation; but this seems to me to be tantamount to saying that a *less exposure* would be better from every point of view.

To the EDITORS.

GENTLEMEN,—I am sorry Mr. H. B. Berkeley failed to get a good emulsion with the samples of pyroxyline I sent him.

Will he, however, try and make a pure collodio-bromide with them and then report again? Ten grains of cadmium or barium bromide and eighteen grains of silver will do well. Any silver beyond this is wasted if the collodion be made with sufficiently-strong solvents to give a good film. Eighteen grains produces saturation.

Having got a good bromide emulsion he will find, I believe, that chloride or iodide is injurious, the latter, though useful (as pointed out by me in an article read three years ago before the British Association) to prevent blurring, having with a good pyroxyline no other advantages, and the great *dis*advantage of being always trying to precipitate itself to the bottom of the bottle and drag the bromide down with it.—I am, yours, &c., H. STUART WORTLEY.

April 4, 1876.

THE REVOLVING CAMERA BACK.

To the EDITORS.

GENTLEMEN,—The revolving camera back described in your last issue as having been exhibited by Mr. J. Werge at a recent meeting of the Photographic Society of Great Britain is no new idea.

Upwards of twenty-three years ago I designed and had constructed a similar back for quarter-plates. By desire of Messrs. Griffin and Co., of London, I forwarded them the back, asking them their idea as to patenting it. Their reply in effect was that "the game wasn't worth the candle." They, however, offered to make and sell it on my account. As I did not care to adopt this course, and believing it would be useful to the followers of Daguerre, whom I had in view when I designed it, I gave them a *carte blanche* to make and sell it on their own account if they thought proper so to do. I believe they acted on the permission given. At least this much I know—that at the next visit of a professional photographer of this town to London shortly after he was shown a similar back as a novelty; but as he had seen mine he told them it was nothing new to him, and that he knew who had designed it. The original back measures a little over fourteen inches in diameter. The weak point about it is, as you very truly remark, its bulk.—I am, yours, &c.,

Worcester, March 27, 1876. CHRISTOPH AËR.

To the EDITORS.

GENTLEMEN,—In one of your recent numbers I noticed an account of a newly-invented revolving slide, exhibited by Mr. Werge at the last meeting of the Photographic Society of Great Britain.

Whatever merits this invention may possess you must not credit it with that of novelty. A well-known firm of photographers in Regent-street had several made for them by Ottewill quite twenty-two years ago. As these were for small sizes and for daguerreotype plates they probably answered the purpose intended; but for the wet collodion process the conditions are so different that some of the plates would most likely be spoiled by the solution draining over the plate the reverse way, instead of in the well at the bottom of the slide. If, on the other hand, it is intended for dry plates, it cannot for a moment compare with the old double slides or new changing boxes.—I am, yours, &c.,

March 31, 1876. ONE OF OTTEWILL'S WORKMEN.

GOOD FRIDAY.

OWING to our usual day of publication next week falling on Good Friday we shall go to press a day earlier than usual, and publish on THURSDAY, the 13th instant. Advertisers and correspondents will please bear this in mind.

EXCHANGE COLUMN.

• No charge is made for inserting these announcements; but in no case do we insert any article merely *offered for sale*, that being done at the small cost of one shilling in our advertising pages. This column is devoted to exchanges only. It is imperative that the name of the person proposing the exchange be given (although not necessarily for publication, if a *nom de plume* be thought desirable), otherwise the notice will not appear.

A 10 × 8 mahogany-cased bath is offered in exchange for a good landscape background in flatted oil.—Address, A. D., West-End Studio, Wilton-road, Salisbury.

A gentleman's gold hunting watch, in perfect condition, a capital timekeeper, recently cost £10, will be exchanged for a whole-plate lens by a good maker.—Address, H. Dyball, 3, Lower-terrace, Notting-hill, W.

A mahogany-bodied lantern, 100 slides, chiefly York's London views, with every appliance for first-class entertainment, offered in exchange for anything useful in photography.—Address, F. Robinson, Harold-hill, Byron-street, Sneinton, Nottingham.

I will exchange, Fowler's *Silver Sunbeam*, Sutton's *Dictionary of Photography*, Hardwich's *Photographic Chemistry*, the *Photographic News* 1858, 1859, and 1860, in two volumes, for anything useful.—Address, M. Wood, 14, Monument-retreat, Waterworks-road, Edgbaston, Birmingham.

A mahogany lantern, three and a-half-inch condensers, object-glasses with rack and pinion, every requisite for exhibitions by the oil or lime light, linen screen nine feet square, and frame for the same with tripod, various slides, the whole nearly new, cost over £15, will be given for good photo. apparatus, lathe, harmonium, or offers.—Address, J. B., care of Mrs. Lockwood, Buck-street, Leeds-road, Bradford.

ANSWERS TO CORRESPONDENTS.

☞ *Correspondents should never write on both sides of the paper.*

Notice.—Each correspondent is required to enclose his name and address, although not necessarily for publication. Communications may, when thought desirable, appear under a *nom de plume* as hitherto, or, by preference, under three letters of the alphabet. Such signatures as "Constant Reader," "Subscriber," &c., should be avoided. Correspondents not conforming to this rule will therefore understand the reason for the omission of their communications.

M. Noton.—Received.

F. R.—We are not acquainted with the address required.

Oxoniensis.—A window about three feet square will answer exceedingly well.

Somerset.—The lecturer was quite right; oxygen *is* the most abundant of all the elementary bodies.

G. A. Baker.—Why not read the directions given at page 112? You will there find all you desire to know.

P. Wright (Loughborough).—The kind of potash to be used for cleaning class is the crude pearl-ash of commerce.

K.—The *carte* of the moss rose is charming, and we shall prize it both on account of its own merits and for the sake of the fair donor.

S. Duncan.—The name "platinum" is derived from the Spanish *plata*, silver on account of the similarity of the two metals in appearance.

Cook.—Sell your dirty bottles to a marine-store dealer if you cannot clean them. A tyro in the art ought to use nothing but clean new bottles.

J. Baxter.—The drab-coloured cards possess the most pleasing tone. The specimen marked A contains a large proportion of hyposulphite of soda.

Jas. Thomson.—We have not yet had time to examine the details of your ingenious shutter, but we hope to do so before the close of the present week.

Thomas Annan.—The specimen you enclose is certainly far from being up to the mark, and it is no wonder you elected to have the work printed in silver.

L. T. Y.—Your friend will succeed much better by adopting the formula published by Mr. J. W. Gough in our last Almanac. That gentleman is a very reliable experimentalist.

W.—The crystals are acetate of silver. After adding the soda you should have acidified the solution by nitric rather than acetic acid. Sun the bath, filter it, and make up its strength with a few crystals of nitrate of silver.

Amateur (Tavistock-street).—The cause of the appearance described by you is over-iodising of the collodion. Add to it about a fourth of its bulk of plain collodion, and if that do not effect a cure add a still larger proportion.

Amateur (Leeds).—Our correspondent informs us that he has tried all the developers recently introduced, and prefers one, containing gelatine, prepared by Mr. Ramsden. It is to be regretted that the latter does not give a formula for its preparation.

G. B. B.—The markings in the negative are caused either by exposing the plate before it has been a sufficient time in the bath to get rid of the "greasiness," or by allowing the developer to run in streaks down the face of the plate while being held up against the light for the purpose of examination.

A. Tyro.—1. In the absence of felt for filtering, ordinary cloth possessing a close texture will answer quite well.—2. The quantity of bichromate to be added to the gelatine must be such as not to crystalise out when the bichromated gelatine has been dried. The solution must be applied hot.—3. The pint-cell Smee's battery will answer well for small pictures.

St. Mungo.—From the fact that you quoted a price for taking each negative as well as for each print taken from the same, it will be held that the negatives belong to the person who gave you the order. You may have charged a very low price for taking the negatives; but it will be found that, having made a charge, they ceased to be your property as soon as the contract was completed.

D. L.—The sample of opal glass must certainly be had. We have never yet seen any glass of this kind that would not immediately yield up its stains on the application of nitric acid. Try the effect of similar treatment with solution of bichromate of potash, to which has been added a few drops of hydrochloric acid. The description of white enamel you require may be prepared by mixing together plain collodion and negative varnish, as described in our Almanac.

Midland Photo.—1. The paper should be dried before the application of the acidulous preparation.—2. We have known galvanised iron troughs for washing prints to have been successfully used, but they are immeasurably inferior to those constructed of slate or even of wood. If the latter material be employed it must receive a coating of a hot melted mixture of wax and paraffine. Several coatings of very thin spirit varnish will also afford the necessary protection to the wood. It is, perhaps, more accurate to say that the first two or three coatings should be given with thin varnish, the object being to allow of its penetration into the wood. The last two coatings may be given with varnish of the usual consistency.—3. While we think the zinc cuttings would not exercise any deleterious action upon the dried prints, it is always better to use glass instead of zinc.

☞ **Editorial Communications should be addressed to "THE EDITORS"—Advertisements and Business Letters to "THE PUBLISHER"—at the Offices, 2, York-Street, Covent Garden, London, W.C.**

South London Photographic Society.—At the next meeting of this Society, to be held at the House of the Society of Arts on Thursday, the 13th instant, Mr. W. Brooks will read a paper *On a New Collo-Developer.*

Photographic *Carte* Mounts.—We have received from Messrs. Frewer and Evans priced samples of *carte* mounts which they are bringing out as novelties for the present year. The designs on the backs are chaste and elegant, and we have no doubt the quality of the cards themselves is most unexceptionable.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
April 13	South London	John-street, Adelphi.
,, 13	Manchester..................	Memorial Hall, Albert-square.

METEOROLOGICAL REPORT,

For two Weeks ending April 5, 1876.

Observations taken at 406, Strand, by J. H. Steward, Optician.

These Observations are Taken at 8.30 a.m.

March.	Bar.	Wind.	Wet Bulb.	Dry Bulb.	Max. Tem.	Min. Tem.	Remarks
23	29·96	N	34	36	47	31	Dull
24	29·71	W	36	38	52	32	Dull
25	29·71	SE	40	43	52	36	Dull
27	29·47	E	37	38	49	35	Dull
28	29·22	SW	49	49	55	38	Cloudy
29	29·35	SW	46	48	52	45	Dull
30	29·65	SW	44	47	55	42	Bright
31	29·58	SE	47	52	63	45	Bright
April.							
1	29·69	NE	45	47	54	43	Dull
3	30·25	SE	43	45	66	40	Dull
4	30·45	W	47	50	67	41	Bright
5	30·52	W	54	56	—	49	Dull

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THE BRITISH JOURNAL OF PHOTOGRAPHY.

No. 832. Vol. XXIII.—APRIL 14, 1876.

A MODIFIED WET COLLODION PROCESS.

Much has been written of late years on the desirability of a process combining the same or a greater degree of sensitiveness usually obtained by the ordinary wet process, with an immunity from the numerous troubles and uncertainties connected with the latter, and many have been the prayers offered up for the consummation of this wish. M. Liebert, of Paris, has recently signalised his idea of the importance of this subject by offering a prize of 500 francs for substantially the same conditions, and it is to be hoped that this will be the means of producing at least some improvement in the direction desired. Various means have been from time to time proposed with the object of shortening the exposures in ordinary studio work, but the majority of these have, upon trial, proved inefficient or have been at best mere makeshift contrivances.

The addition of certain substances to the nitrate bath—such, for instance, as nitrate of uranium—has not, up to the present time, been attended with success; while such "dodges" as pre- and after-lighting, after a thorough ventilation in our own and other pages, have been pretty generally set down as incorrect in theory and inefficient in action. M. Liebert had probably these and similar means in view when it was laid down in the conditions of the competition that the improvement should be in the chemicals and the method of using them, and not of an optical or mechanical nature. The opticians have certainly, during the last few years, done much to further the object in view as far as regards decreasing the exposure; but it is not to be expected that they can go on for ever, and we think it is quite time that the chemists stepped in with their assistance.

The requirements in a new process of this description are—first, greater rapidity; second, simplicity of manipulation without uncertainty of result; and, third, a method that shall not materially depart from the usual studio routine to which operators have become so much accustomed. This latter condition is, perhaps, of more importance than may at first sight appear; for it cannot be denied that many valuable improvements in various branches of the art have been allowed to languish and fall into disuse simply because they involve manipulations to which the average photographer has been hitherto a stranger, and which he is unwilling to inconvenience himself by acquiring.

This will probably account for the non-adoption of a simply bromised collodion and strong nitrate bath, which has been long recommended as giving very rapid results, together with other advantages. Even when used for dry plates this method confers a degree of rapidity upon the plates scarcely, if at all, inferior to the best results obtained with wet collodion; but unfortunately portraitists, and indeed professional photographers generally, have a strong prejudice against dry plates in any form, while at the same time alkaline development is an innovation which has not yet found, and probably will not for some time find, its way into the studio. But if so high a state of sensitiveness be obtainable with a dry film, it must be evident that by employing the same materials, and exposing the film while still wet and without removing the free silver, a much higher degree of rapidity will be secured; and such proves to be the result in practice, while the liability to pinholes and other defects usually experienced in connection with wet plates is very much lessened.

Unfortunately, however, there are found to be objections to this process of a sufficiently pronounced character to hinder its adoption by the "average" operator, but not, in our idea, to deter an intelligent man from at least testing it practically. The principal of these objections are—the very strong bath required; the length of time occupied in sensitising; and a slight difficulty, under certain circumstances, in attaining sufficient density. The first one is based, no doubt, upon the supposition that the increased strength of gas—80 to 100 grains per ounce—means increased expenditure. We might easily prove the fallacy of this idea, (at least in careful hands, for it is obviously more expensive to "slop about" an eighty- than a thirty-grain solution); but we do not consider the plea of a slight increase in expenditure as worthy of being balanced against advantages such as those in view. The second objection is worthy of greater consideration, for the business of a well-patronised studio renders every moment of consequence; and a plate which requires ten minutes or a quarter of an hour to sensitise stands at a disadvantage as compared with one which only requires five minutes. This difficulty might, however, be obviated by the use of two or more baths—a plan which, even under present circumstances, is adopted in many first-class studios. The last objection is merely one of manipulation, and rapidly disappears with practice; but, were it otherwise, we think it likely that it would in many cases prove to be an advantage in preventing those chalky lights and white faces which ruin such a large number of portraits.

As an alternative to the last plan proposed we might mention bromised emulsion; but we know that we should at be at once met by a general outcry, for a greater prejudice appears to exist amongst professional photographers against that branch of photography than against any other. But those who are so prejudiced against emulsions are probably not aware how really high a degree of sensitiveness is attainable by their means under special treatment—treatment, moreover, which is thoroughly adapted to studio requirements. During last year we had occasion to speak more than once of the use of emulsion plates in the wet state, and were able to assert that when so employed the rapidity was quite equal to that of ordinary wet plates prepared in the bath. To produce this favourable result it is by no means necessary to employ those extra-sensitive preparations used in very rapid dry work, and to which so many suspicions of uncertainty are attached. A moderately-sensitive emulsion, and one which may, therefore, be trusted to produce results of good quality and perfect uniformity, will be found quite sufficient, and will not overtax the manipulative skill of an ordinary operator in its preparation.

Such an emulsion will very nearly approach wet plates for portrait work if, after coating the plate, it be dipped into distilled or rain water for about the same length of time that a collodionised plate is allowed to remain in the silver bath, the only object in view being to remove the ether and alcohol from the film and a portion of the soluble bromide. After exposure the image is brought out by means of the ordinary iron developer, to which a drop or two of silver solution must be added. Much greater rapidity is gained by sub-

stituting for the water in which the plate is washed a dilute solution of albumen rendered slightly alkaline, in which the plate remains until the greasy lines have disappeared. Such a plate, if developed with alkaline pyro., will be found to work with as great rapidity as the best bath plate, and may, with care, be made much more rapid. But here, unfortunately, the prejudice against alkaline development is raised as an objection. That, however, is not an absolute necessity; for a solution of *plain* pyro. will be sufficient to bring out a faint image, which may be afterwards intensified in the usual manner with silver. One great advantage of this method lies in the fact that a number of plates may be coated in the morning with the emulsion and allowed to soak in a dish or grooved box containing water or alkaline albumen as may be desirable, and are ready for use when required, all that is necessary being the draining of the plate previous to transferring it to the slide; there being no free silver present the film is in no way injured by a soaking of several hours.

It has been proposed, in order to increase the rapidity of wet plates, to add to the collodion a small quantity of silver nitrate, thus forming a sort of emulsion containing a *large* excess of soluble haloid. How far the plan has been found successful we are unable to say, but the process which we wish to recommend to our readers involves an extension of the same idea. It consists of an emulsion of bromide of silver containing a *small* excess only of soluble haloid, in which state it will keep for a very considerable period, and is possessed of but little sensitiveness; it may, in fact, for all practical purposes be considered as insensitive, for, heretical as the statement may be considered by some, if not exposed for a lengthened time to direct sunlight it may be allowed with impunity to remain in diffused daylight. When required for use the plates are coated and dipped into a weak silver solution until the greasy lines disappear, when they are ready for use.

It may be asked what advantage is gained by such a roundabout proceeding as the formation of an emulsion to be afterwards re-sensitised. The reply is simple; it results in the formation of a film almost identical to that produced by bromised collodion sensitised in the bath (and which is quite unattainable with any ordinary emulsion), while the objections we mentioned in connection with the bath process are entirely obviated. The difference between a bath film and an emulsion one—a matter which is already fully understood by emulsion workers—is that the former presents a surface containing free silver while the interior contains free soluble haloid; an emulsion film is uniform throughout. In order to produce a satisfactory result the emulsion film must either contain soluble bromide or some other restrainer must be used in its preparation, each of which conditions is incompatible with that high sensitiveness for which the wet bromide plates are noted. It will also be remarked that in the process we recommend a portion of the free haloid may be retained *in* the film though its surface holds excess of silver, while, at the same time, the silver bromide being formed in the emulsion the time of immersion in the silver solution need be no longer than is requisite to remove greasiness.

The formula we have employed with the greatest success consists of—

Ether	1 ounce.
Alcohol	1 „
Pyroxyline	10 grains.
Bromide of cadmium (dried)	24 „
Nitric acid	1 minim.

This collodion is to be sensitised with fifteen grains of silver nitrate to each ounce, and, after standing from twenty-four to forty-eight hours, five grains more of bromide of cadmium should be added. In this state it contains between two and three grains per ounce of free haloid, and will keep for some months. To sensitise the plates they are dipped, until the greasy lines vanish, in a solution composed of—

Filtered rain water	20 ounces.
Silver nitrate	from 200 to 300 grains.
Nitric acid	5 minims.

The acid is optional, and the strength of the silver solution is not a matter of great importance if the limits given above be adhered to. The exposure is quite as rapid as with ordinary bath plates, and the development in every way identical.

The advantages of this process are—1st, there are no troubles arising from disordered baths; 2nd, the plates are uniform, free free from stains, and streaks of unequal sensitising; 3rd, they are very rapid; 4th, the manipulation is in no way different from that to which operators have been accustomed. If it be stated that there is nothing new in the above, we can only say that we do not think it has been used before, and strongly recommend our readers to give it a trial.

A PHOTOGRAPHIC PUZZLE.

Notwithstanding our rapid advance in the knowledge of the conditions under which photographic action takes place, and of the modifications by which that action may be controlled, there is still much that is unknown or difficult to explain, while there is, probably, a great deal that we can hardly hope ever to learn. In the midst of such darkness and difficulty one never knows from whence a ray of light may come, or to what an apparently trivial matter may lead. We have, therefore, much pleasure in directing attention to a subject brought before the Edinburgh Photographic Society by Mr. Dallas and Mr. Mathieson—the latter being assistant to Professor Tait, of Edinburgh University—and the details of which will be found in our report in another page.

It would appear that for a considerable time a number of experiments in photographing various spectra have been made in the laboratory connected with the department of Natural Philosophy in the University, and that the spectrum of the electric spark has received considerable attention. On a recent occasion the spark from a large induction coil was brought into requisition, and many dozens of plates were exposed and developed with varying degrees of success. With one single exception all the plates were clean and perfectly free from markings of any kind, showing after development the spectrum band only, all the rest being clean glass. The exception was the "puzzle" which Messrs. Dallas and Mathieson sought to solve through the aid of the Society; and the plate and a print from it lie before us while we write.

The negative is on a quarter-plate, and in the centre, running across the short length, is a tolerably well-defined band, the principal lines being quite visible to the naked eye, and those lying closer together are easily resolvable with a lens of moderate power. So far all is as might have been anticipated; but there is something more which was not expected, and for which no satisfactory explanation has yet been offered. Above, and somewhat to the right of the spectrum, appears what at first sight looks not unlike one of the many-spoked bycicle wheels, but *minus* the tire, the spokes terminating in fluffy, brush-like markings. A closer inspection reveals a somewhat irregular nucleus, succeeded by a dark ring. This is followed by a white ring, and then another dark ring of much greater breadth. From the latter there springs with much regularity a series of radii of about an inch in length, starting as points, and gradually increasing in breadth till near the ends, where they terminate in the brush-like appearance already mentioned. If still more carefully examined, the alternate circular bands of light and dark are found not to be confined to the centre, but are quite visible on the radii as well, to the extent of five well-defined bands. The whole produces a circular figure of much regularity and beauty, slightly imperfect only at the lower left side, where the radii are considerably shortened, as if on purpose to keep clear of the spectrum, a large portion of which would have been covered had they extended as far as the others.

During the discussion which followed the exhibition of the plate and prints various suggestions were made as to the probable cause of the phenomenon, but none of them were considered satisfactory. The general impression seemed to be that a spark had been attracted by some ball or point; but it is hardly likely that such an occurrence could have taken place in a line with the slit, or in such a position that the light could have passed through the prisms or otherwise have reached the plate. Mr. Dallas seemed to have a strong impression that it was an effect of decomposed light, and tried to

connect the appearance with the phenomena known as "Newton's rings;" but of that we think there is room for considerable doubt.

We are disposed to regard the phenomenon as due to light that had passed through the prisms, as, on carefully examining the supposed nucleus with a somewhat high magnifying power it seems pretty clear that it is really a minute copy of the spectrum, or of a spectrum of alternate bands of light and dark. That it could not have been caused by a spark from any body within the reach of the discharging rods is, we think, evident from the fact that the image of the spectrum required for its production an exposure of three minutes. Now, the abnormal image is at least quite as fully impressed, and therefore must have, if it passed through the prisms, quite as full an exposure; but, although a single spark might have passed without notice, it is hardly conceivable that a succession of sparks lasting all that time could have passed unobserved by the several experimentalists who were at work.

We confess our inability, without further investigation, to give any satisfactory explanation of these appearances, but think the subject quite worthy of careful attention. Meanwhile, we shall be glad to learn whether others who may have been working in a similar direction have encountered anything of an analogous nature, and shall be happy to show the prints in question to those who will take the trouble of calling at our office for the purpose.

RECENTLY PATENTED INVENTIONS.

No. VIII.—LAMBERT'S CHROMOTYPE PRINTING-FRAMES.

The name of M. Claude Léon Lambert has, during the past twelve months, been brought prominently before our readers in connection with certain improvements effected by him in the production of photographic prints in carbon. One of these improvements has been designated "Lambertype," and another "chromotype."

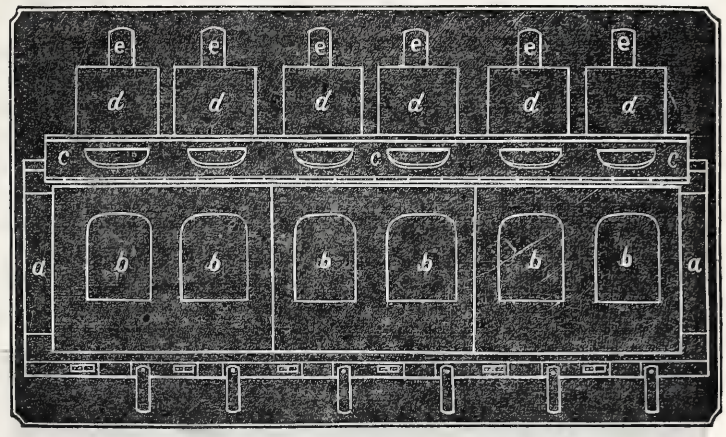
The former is a method of producing enlargements the special feature of which consists in covering both sides of the negative with thin translucent paper and retouching on both sides. In the latter the leading idea is to be found in the developing of the carbon picture on a plate of glass which has previously received a coating of collodion. This was suggested at a date long before the formal introduction of the "chromotype" process of M. Lambert; but it does not appear to have been much, if at all, adopted. Certain it is that by means of this, coupled with other simple "dodges," such an improvement was effected that one result of the introduction of chromotype printing was the immediate production of a class of carbon prints possessing far finer gradation and detail than any that had been previously produced in the ordinary way of business.

When we last wrote on the subject of the chromotype we made a passing allusion to the ingenious mechanically-registering and printing and tinting frame which we had seen used on the occasion of our witnessing the operation of chromotype printing at the *atelier* of M. Lambert at Greenwich. By means of these frames tinted borders of any fanciful device, and also monograms, coats of arms, names and addresses, &c., were produced in the picture in the course of the printing in a manner exceedingly simple. We could not at that time give a detailed description of this frame, but we are now in a position do so, as we have access to the patented specification, of which we shall proceed to give an abstract.

The invention is of a three-fold character, relating—first, to the improved frame which is to form the main theme of the present article; secondly, to a photometer to be used in connection with carbon printing; and, thirdly, to an apparatus for cutting sensitised paper with great precision, and by means of which all soiling of the paper by contact with the fingers is prevented.

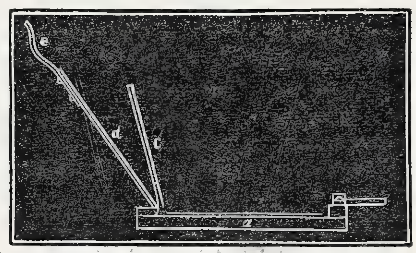
With respect to the first of these—the printing-frame—its construction can only be properly understood by reference to the accompanying diagrams, of which *fig.* 1 shows a plan, and *fig.* 2 an end view of the frame. In the former of these (*fig.* 1) a glass plate, *a*, is shown fixed in a suitable frame. The glass is obscured (by the ordinary black paper used for masks or by other means), with the exception of any convenient number of apertures, *b*, of round-cornered, oval, or other desired form. Upon these apertures the negatives are placed, and are held securely in position by the frame *c* hinged to the main frame of the press, which

FIG. 1.



is then folded down upon the negatives. This frame has rectangular apertures covered on the side next the negatives by masks, having openings of the size and form for the picture only, which coincide with, but are about one-fifth of an inch smaller than, the apertures *b*.

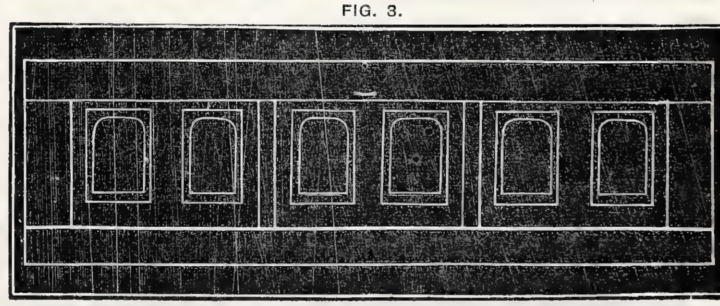
FIG 2



The sensitised papers, previously cut of the proper size, are then placed in the apertures of frame *c*, and the hinged flaps *d*, which are covered on the inner side with a pad or cushion of felt or other suitable material, are then folded down and pressed upon the sensitised papers by springs *e* and the fastenings shown, or by other means, as in ordinary presses.

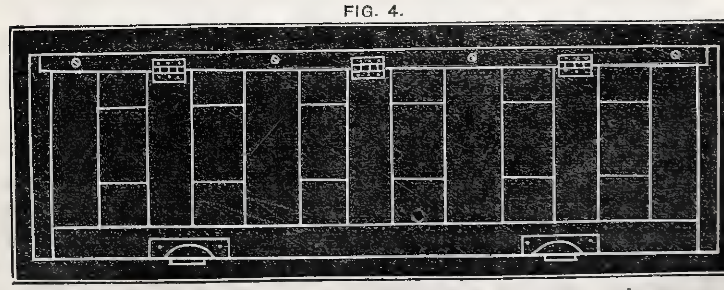
The frame for printing the border is shown in front and back view in *figs.* 3 and 4 respectively. It is constructed in much the same

FIG. 3.



way as that above described, but differs therefrom inasmuch as in the former case the place for the border was masked, whereas in this frame the picture is protected by a mask of corresponding shape fixed to the glass in the middle of a larger aperture of rectangular

FIG. 4.



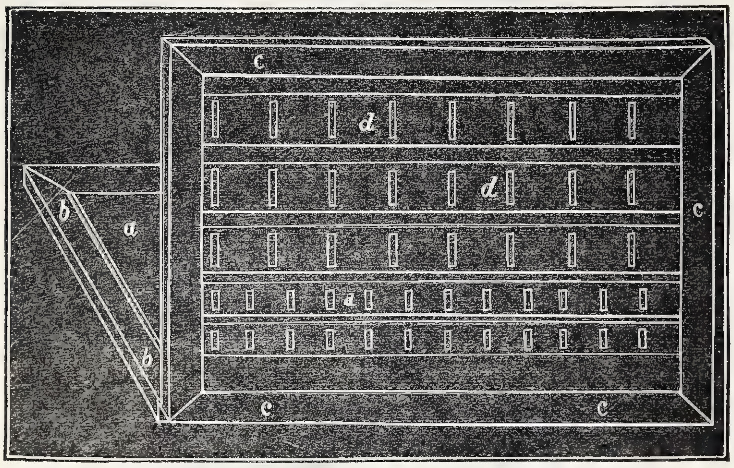
form, and which should be slightly larger (according to the amount of relief required) than the apertures of the first frame. By this

means the desired relief effect may be produced from left or right by shifting the sensitised papers towards one side or the other.

In order to obtain a tinted border with names, arms, or ornamentions of any kind, the patentee employs a transparent tissue, preferably prepared in the following manner:—A glass plate made chemically clean is coated with wax and then coated with "two per cent." collodion, which when evaporated receives a layer of a twenty per cent. solution of gelatine at a temperature of 86 Fahr., and when this layer is dry collodion is again applied, and when completely dry the whole is detached from the glass. This flexible film is unalterable both by humidity and dryness, and forms a flexible translucent surface, which may either be left plain or upon which any desired device or designs to represent the veinings of marble or imitations of other substances may be printed, lithographed, or photographed.

Fig. 5 shows a perspective view of the cutting apparatus. It consists of a glass plate, *a*, to support the paper fitted in a wood frame, *b*,

FIG. 5.



so as to project slightly from the surface thereof; *c* is another wood frame, in which are fitted a number of iron bars, *d*, which project from the surface of said frame, said bars having a number of transverse slits, and corresponding exactly to the width and height of the apertures of the frame *c*, *figs.* 1 and 2. The sensitised paper, whether in sheets or from the roll, is placed between the two frames, which are then locked together by any suitable means, whereby the paper is held firmly whilst cutting it. The space between each bar should not exceed two-fifths of an inch.

Of the registering photometer we shall not at present speak.

The patentee also prints by the means above described, either in salts of chromium or otherwise, various kinds of ornamentation to serve as a border for portraits or other pictures for use in illustrating books, albums, or screens, by which means a highly artistic effect is imparted to these pictures.

To obtain a tinted border with names, armorial bearings, or other ornamention, either a lithographed, engraved, or other glass may be employed besides the transparent tissue before referred to.

The points claimed as novel in this invention are—

The construction and use as described of the improved printing-frames illustrated in *figs.* 1, 2, and 3, 4, of the drawings.

The improved paper-cutting apparatus, *fig.* 5, by the use of which all soiling of the paper with the fingers is avoided.

The improved registering photometer shown in *figs.* 6 and 7, not engraved in the present article.

Lastly, the application of ornamental borders, produced as above described, to portraits and other pictures, as described.

In our remarks upon the shape of photographs last week we omitted to mention a useful method, under some circumstances, of producing a sort of panoramic picture by means of a stereoscopic camera used by ourselves many years ago, and which in the hands of others has produced very fair results. Our readers are acquainted with the plan frequently adopted of mounting side by side two or more pictures taken from the same point of view, so as to form a single picture including a large angle of view. The method we refer to is upon the same principle, only the two pictures (no more can be combined in this manner) are combined on the negative instead of being produced from different plates. The mode of action is as follows:—Having selected the subject, which must be suitable to the "panoramic" style of picture, select some point about the centre which must form the point of junction. Then, closing the left hand lens, turn the camera so that the left hand portion of the subject will fall upon the right hand half of the plate, the point selected for forming the junction coinciding exactly with a pencil line drawn vertically through the centre of the focussing-screen, and having focussed carefully insert the slide and expose. The second half is produced by turning the camera in the opposite direction, so that the right-hand portion of the subject is thrown upon the left-hand end of the plate, the junction being made by bringing the point selected upon the same central line—an operation which requires care, and upon which much of the success of the result depends. One or two conditions are requisite in order to ensure success:—1st, the camera must be perfectly level, both in the directions of the line of sight and the base line; if this be not attended to the horizontal lines will fall away in opposite directions, giving a distorted appearance to the picture. 2nd. The central division of the camera must be so arranged that the two halves of the picture just meet without overlapping, or a vertical line will be visible at the junction; different means of effecting this will suggest themselves. This will be found a rather useful "dodge" under peculiar circumstances, though it is scarcely correct in theory; for which reason it cannot be recommended for architectural subjects except under very favourable conditions. We write this having a perfect acquaintance with the panoramic camera of Mr. Raine, of Richmond, Yorkshire, in which provision was made in a very ingenious manner for effecting the merging of one view into the other. As a description of this camera has appeared in a former volume of this Journal, we here merely allude to it without entering into detail.

FURTHER NOTES ON THE EFFECTS OF LIGHT ON PIGMENTS.

[A communication to the Edinburgh Photographic Society.]

Two years ago I gave some results of a series of experiments on the effects of sunlight on a variety of pigments. The most notable of these results were—the satisfactory permanence of Prussian blue, especially as an oil paint, and the unexpected deficiency in this respect of Vandyke brown and some other colours. I also noted the discovery that a liberal supply of gum arabic gave greatly-increased stability to the splendid scarlet biniodide of mercury.

Some months ago a promising young analytical chemist placed in my hands a set of aniline colours prepared by Messrs. Dahl, of Barmen. This prompted me to prosecute further experiments upon the permanence of these colours; and the great variety of their behaviour when mixed with different mediums led me to hope that I might hit upon a substance which would confer upon some of these colours, when used as paints, a satisfactory degree of permanence. It was when thus hopeful of a valuable result that I rather rashly consented to read a paper on the subject. But further experimenting has not led to success, and the deeper I have gone into the matter I have felt more and more convinced that the daily-extending use of the aniline colours must be looked upon in some of the directions it is taking as a serious evil.

The colours I dealt with were named—

No. 1. Methyl green.
,, 2. Blue-green (light).
,, 3. Alkali blue.
,, 4. Methyl violet, B. B.
,, 5. Methyl violet, R.
,, 6. Rosaniline hydrochlorate.
,, 7. Cerise.
,, 8. Phenol yellow.

I may remark that the manufacturers of the violets attach letters "B" or "R" to the name to indicate the blueness or redness of the hue, sometimes using as many as four letters.

These aniline colours are characterised by a great many interesting chemical and optical properties. [Some of these were exhibited before the Society.] They are all readily dissolved by alcohol, but all are insoluble in turpentine. No. 1 is very soluble in water, No. 2 not at

all so, and the others are soluble more or less in water, but not so perfectly as in alcohol.

To arrive at correct ideas regarding the chromatic qualities of a pigment it is necessary to ascertain which rays of the spectrum it absorbs; this is very easily done when the colour is presented in the condition of a transparent solution. All we have to do is to place some of the liquid in a cell having sides of plate glass, and look through this at the spectrum; or, still simpler, a white glass bottle containing some of the solution may be placed just outside the slit of the spectroscope. Tested in this way it will be found that the beautiful colour No. 4 is not truly a violet—as is a deep solution of ammonio-sulphate of copper—but, like most of our richer blues, a *purple;* by this I mean that we have in it an admixture of some of the red of the lower or rear end of the spectrum. Indeed, when this colour, and also Nos. 1, 5, 6, 7, and 8, are taken of such depths that only a small portion of the light from the sun can pass through them, that residue of light is pure red. An amount of the colour No. 4, which thus cuts off all the spectrum but red, may show the lines A and *a*, and have its centre of illumination midway between these lines.

On reducing the depth of colour the band of red becomes broader, and its centre of illumination advanced to, say, a little beyond *a;* and now a violet band of light appears of about the same width as the red one, and having its centre of illumination at a distinct line between G and H—say G, 0·56 H; that is to say, fifty-six hundredths of the distance between G and H in advance of G. (This is a convenient way of noting the position, but is only approximate, as the apparent proportions will vary with different prisms.) On further reducing or weakening the screen of colour the blue band increases in width and brightness much more rapidly than the red band; and as the weakening goes on the centres of brightness of the bands approach nearer to the centre or yellow of the spectrum. Thus at one stage we have the red so widened out that its centre of brightness is advanced to B, while the band at the blue end is so much widened as to embrace G and H, and has its centre (as judged of by reducing the light) at G, 0·43 H_1. We here have both extremities of the spectrum well seen, and the blocked-out portion becomes narrower and narrower as we reduce the depth of colour of the liquid, until, when greatly attenuated, the only peculiarity strikingly visible in the full sunlight is a narrow dark shading around D.

On adding an acid—say hydrochloric—to Nos. 4, 5, 6, or 7 the solution, after passing through some intermediate colours, is, when sufficient acid has been added, changed to yellow; and on adding water in large quantity to the yellow solution there is a partial revival of the original colour. No. 4 exhibits these curious changes in the most perfect manner, and I beg an exhibition of your patience while I more particularly describe the chromatic changes.

By gradually adding hydrochloric acid to solution of the methyl violet, B B, the liquid assumes in succession a beautiful variety of tints, passing from purple through blue, blue-green, green, yellow-green, and at last reaching yellow. It is interesting, at the same time, to examine these various colours by the spectroscope. I shall only mention that, while we may notice some minor movements of the red band, the more refrangible or advanced one travels gradually backwards, changing in colour from violet to blue, aad then green. When the yellow colour has been produced the spectrum shows that the two bands have coalesced, and from a point near E the forward portion of the spectrum is shut out, while the extreme red is well seen.

On adding water to this yellow mixture it first becomes, say, a fine green, the spectrum of which shows a red band with its centre between B and C, and a wide green band with its centre below E. Adding more water causes the latter to rise to E, while the red remains at its previous position; adding still more water causes the blue to open out, so that there is little loss of light except from a dark shading at about C, 0·4 D, and a general dimness in the spectrum behind a point a little in advance of D.

The effect of light upon the simple aniline colours is soon manifested by the destruction of the beauty of all the samples except No. 8, and a few hours' exposure materially injures the fine purple violet No. 4 by reduction of its blueness. After a few days' exposure the four colours, Nos. 4, 5, 6, and 7, are all turned to nearly the same dirty crimson red—Nos. 4 and 5 losing blueness, and Nos. 6 and 7 becoming darkened. A more lengthened exposure then reduces the depth of colour of each of these, all becoming much lighter, especially No. 4, which is at last almost bleached. These successive changes are shown on sheet B. The fine green colour No. 1 does not show such rapid change at first, but the loss of depth goes on regularly, and on sheet A, where not protected by coloured glass, it has become almost white. The blue, No. 3, soon loses its beauty, but after lengthened exposure still retains a considerable body of colour.

The seven samples first in the list are thus shown to be very unsatisfactory, and No. 8, though much better, is far from permanent, as there is evidently some loss of beauty and depth of colour.

The effects upon the aniline colours of the light from different parts of the spectrum should be a subject of considerable interest to photographers. It would be tedious to apply the actual spectrum even in the most favourable circumstances, and the dark season of the year in which I experimented precluded any attempt at this. But I have exposed some of the colours under stained glasses, and, making allowance for the depth of the tints of the glasses, it appears that the methyl violet, B B, is acted upon with considerable energy under the red, orange, yellow, cobalt blue, and the paler purple; whereas the green glass preserves the blueness of the colour in a very remarkable manner. In order to establish satisfactorily whether the more refrangible end of the spectrum acts with much energy on this colour, it would be necessary to expose it under a cell containing solution of ammonio-sulphate of copper, so that the red and yellow rays might be completely cut off.

The orange-coloured glass, as shown on sheet A, has a well-marked power of preserving the methyl green, No. 1; and under it, although the phenol yellow, No. 8, is somewhat reduced in depth, the colour left is a very pure yellow. I need not speak of the power of the coloured glasses to preserve the dirty red hues to which Nos. 4, 5, 6, and 7 are soon reduced.

The effects produced by mixing the aniline colours with different mediums are so decided and various that the hope I indulged in that some substance might be found capable of preserving the beauty of the violet No. 4 was not altogether unreasonable. The effects of more than twenty substances were tried upon this violet. Several, such as paraffine, wax, sperm, &c., were quite inert. Those which appreciably increased the permanence were starch, white of egg, and Canada balsam. With these the colour was preserved to a considerable extent in body, but turned to a purple much less blue than the original. With shellac varnish the sunlight destroys the beauty of the colour, but leaves it, in some cases, fully darker than the original.

But the most remarkable and alarming result is that for the mixtures with drying oil, megilp, or "Robertson's medium" the destruction of the colour by the action of the sunlight is greatly hastened compared with what takes place with the simple colour. Before altogether disappearing the colour becomes green and yellow. With mastic varnish also the colour goes rapidly.

Examples are placed on the table of printed circulars that have been "sunstruck," and many such may be seen any day in our streets or shop windows. I just lately observed a poster originally printed in blue ink, which a few days of sunshine had reduced to a base, dirty green.

The use of these beautiful colours is becoming every day more extended, and a watchful eye ought to be kept upon their employment for unsuitable purposes.

It was but last summer that, in woollen fabrics, many of the grey trouserings had received a dip that greatly improved their colour; but the result was that after a few weeks' wear the parts most exposed to the light exhibited a dingy yellow hue, giving a dirtied appearance as contrasted with the more shaded parts. Then, as to cotton prints: I am sure you will agree with me in thinking that nothing can look nicer than a well-made, clean, cotton print dress; and the great value of these prints was, in older days, that though easily soiled they were easily washed, and the washing had little impairing effect upon the colours. But I here show you a specimen of cloth which after three ordinary washings became white, and a piece of the cloth was reduced at one operation of a more thorough kind to the pure white state shown by the piece No. 2 which lies before you.

There is an unfortunate change going on around us in the matter of dress. These cleanly, cotton prints are falling into disuse, and in their stead we find nasty finery—woollen and silken fabrics—which in a short time become offensive with dirt and grease. Now, if the use of these dyes in cotton printing hastens in any degree this most objectionable change in the mode of dressing, it is a point against them of considerable sanitary and æsthetic importance. If the increasing custom of the people to wear unwashable garments is not to be stayed it is very desirable that some effort should be made to introduce the use of cotton blouses to protect the other fabrics when engaged in occupations that soil the clothes.

Aniline colours are now used for writing ink. Their not corroding steel pens is certainly a great advantage; but writings are frequently much exposed to light, and the faintness to which they would be reduced may be a source of annoyance.

From the injurious effects of drying oils upon some of these colours their employment for printing inks is much to be condemned—the more so that we have been led to place great confidence in the permanency of printed documents. This use of aniline colours may become a very serious evil should they be used among those employed in producing high-class chromolithographs. The temptation is considerable from the variety and beauty of their tints.

For travelling so much outside of my subject as I have done I must beg to be excused on the plea that otherwise my contribution would have been ridiculously short.

Robert H. Bow, C.E., F.R.S.E.

PRACTICAL NOTES ON THE GELATINO-BROMIDE PROCESS.

The following notes may be of interest to amateurs practising the gelatino-bromide process, and if they originate a discussion on certain points connected with it I hope they may be found generally useful.

During the late cold season I have returned to my experiments with gelatine, after several months of idleness. I find no difficulty in getting perfect films and great sensitiveness, but I must admit that printing density is not as easily obtained when the emulsion is in its most sensitive condition. I find that the use of carbonate of ammonia in place of liquor ammonia is of advantage, as there is less chance of the image being reduced in density by an overdose of alkali; and this method of continuing development with fresh solution containing a larger dose of pyro. is very often successful when things seem to have come to a standstill. I find that the films bear any amount of washing without blistering or other injury *during the cold season*, which is the only time in which this process could be successfully employed in a tropical climate, so far as I can judge.

One thing to be guarded against is actinic light. I had a large batch of beautiful films ruined because they were prepared in the full light of a full moon; and I believe that a good deal of tiresome fog is due to the actinic character of the light by which development is conducted. I have used common water with perfect success, but cannot recommend it when distilled water is procurable, as it no doubt introduces an element of uncertainty.

As an example the following may be found instructive:—I prepared two and a-half ounces of emulsion by the dialytic method, and coated twelve plates with it, which turned out admirable. Two days afterwards I coated twelve more with the remains. They were technically perfect. The emulsion did not show any signs of decomposition, and the only suspicious circumstance was that when viewed by transmitted light it did not show the rich ruby glow which is an infallible test of quality. The plates were rapid, but no amount of restrainer would keep off fog, and I can only come to the conclusion that some of the bromide of silver was converted into chloride. This is contrary to your views, and I am not hardy enough to suppose that it will receive general favour; but I can find no other solution for this phenomenon. The water with which the emulsion was made was the same as that used for dialysing it, and was full of chlorides, which the process of dialysis consequently kept up to nearly full strength. It follows that an appreciable quantity of soluble chloride survived that operation; and, as free nitrate of silver would have been diffused if any existed (which is hardly probable, as I used somewhat less than the proper dose of silver), I can only suppose that chlorine was somehow liberated, and displaced a portion of the bromine combined already with the silver, thereby rendering the emulsion more irritable under the action of the alkaline developer. I may mention that I had noted this fact and drawn my conclusions on it before I saw the correspondence which has lately been going on between Messrs. Berkeley and Robinson and yourselves on the affinity of the halogens for silver.

My experiments with gelatine are over for the present. The excessive temperature of the hot weather would make development impossible without the use of ice, and the moist heat of the rains would impair the setting power of the emulsion too much to make it worth while to work the process in those seasons; but for the temperate, dry climate of Guzerat during the cold weather it is very well adapted. As the nights are calm coating can be carried on in the open air very conveniently if the full moon be avoided. I find plates dry in the open air in two and a-half or three hours, but prefer to use a tin box, with a few pounds of quicklime at the bottom, in which I put my plate-rack. Films dry thus without a mark and as bright as glass, and can easily be removed before daybreak to the slides or plate-boxes.

The only drawbacks I find are a tendency to blurring on the horizon and about the margins of foliage, and a pink veil which sometimes covers the shadows. The former would probably yield to the usual treatment with *backing*, though I think a sunshade to the lens would generally answer all purposes. The latter is certainly often the result of admitting actinic light to the plate before fixation is complete; but I have been sometimes annoyed with it when I could not account for it in that way. If Mr. Palmer or any other worker in gelatine will kindly let you know how they fare on these points I for one shall be grateful.

I may mention that, after having carefully tried several methods of development, I find that the density of the picture depends to a great extent on the quantity of pyrogallic acid employed, and that comparatively little ammonia is required to get very good results. This I find is entirely in accordance with Mr. M. Carey Lea's experience, recorded in this Journal of the 28th January. Allow me to congratulate you on the reappearance of that gentleman as a contributor in your columns. There are few to whom amateurs owe so much. I found his process of 1870 delightfully simple and trustworthy, and am glad to see that it secured honourable mention at a meeting of the West Riding of Yorkshire Photographic Society the other day. Mr. Lea's remarks on trifling matters of manipulation are as valuable in their way as his chemical notes. I have found his hints as to the tenacity of dust and filaments on the glass plate under the gentle discipline of a soft brush very useful, and, thanks to it and a *clean* glass rod, which should be drawn through a damp cloth every time it is to be used, I find no difficulty in getting gelatine plates as free from specks and spots as I could wish.

J. King, *Bombay C. S.*

NOTE ON THE PRODUCTION OF ANTIMONY PHOTOGRAPHS.

[A communication to the Photographic Society of Great Britain.]

The photographs which I have the honour of submitting to the notice of the Society are the work of Mr. Francis Jones, of the Manchester Grammar School, who showed them at a recent meeting of the Chemical Society as having been produced in the course of some experiments upon the gas known as stibine, or antimonietted hydrogen, SbH_3. The author found that when a current of this gas was passed through glass tubes containing sulphur, and exposed to sunlight, a decomposition was effected, resulting in the formation of the orange sulphide of antimony, the chemical reaction being explained as follows:—

$$2\ SbH_3 + 6\ S = Sb_2S_3 + 3\ H_2S.$$

No action takes place in the dark; so that it was found possible to utilise the reaction as a photographic printing process; and the impressions of ferns now shown were obtained by simply passing a current of antimonietted hydrogen through a kind of printing-frame containing a sheet of paper impregnated with sulphur, upon which the fern was laid and gently pressed into contact by a glass plate in front.

For the preparation of the sulphur-paper Mr. Francis Jones saturates ordinary writing-paper with a solution of sulphur in carbon disulphide, and allows the solvent to evaporate in the air. By this means minute crystals of sulphur are left deposited in the pores of the paper; and any excess remaining on its surface can be rubbed off with a tuft of cotton wool, so as to ensure uniform impregnation. No fixing process is required; for as soon as the printing has advanced sufficiently far it is only necessary to stop the evolution of gas, or disconnect the generator, whereby all further action is prevented, and the image remains as a permanent metallic sulphide imbedded in free sulphur. The tint thus resulting is identical with that of the pigment used in the production of red rubber goods, and is believed to be equally permanent. I find, however, that an after-treatment with silver or copper salts in solution transforms the orange sulphide of antimony into the darker-coloured sulphides of those metals; so that the process, thus modified, lends itself to the production of photographs of a more agreeable tint.

For the toning of these red antimony photographs I have used a cold solution of ammonio-nitrate of silver, which does not affect the protected (sulphur) portions of the design, but quickly blackens the sulphide of antimony. In the specimen shown the excess of silver was afterwards removed by washing with dilute ammonia; but I found no difficulty in applying a weak hyposulphite solution for this purpose. It is important, however, to avoid the application of heat whilst toning; for under these circumstances the alkaline silver solution readily acts upon the sulphur, and a general blackening is the result. Mercury salts did not work satisfactorily, and acetate of lead not at all; but an agreeable brown or chocolate tint may be got by toning with ammonio-sulphate of copper. An example is shown in which, judging from the colour of the deposit, we may fairly

assume that the design is built up of a double sulphide of copper and antimony.

Care must be taken to avoid the inhalation of antimonietted hydrogen, which is a poisonous gas; but inasmuch as the printing operation would ordinarily be conducted in the open air, there is less chance of danger from this cause. The gas itself is evolved by acting with dilute sulphuric acid upon an alloy of zinc and antimony, containing five per cent., or less, of the last-named metal, which can be prepared without difficulty by throwing the required proportion of metallic antimony into the melted zinc, and granulating as usual by by pouring the fused metal into cold water*. A Woulfe's bottle with funnel and delivery-tube forms a convenient apparatus for generating the gas; and if it be led into the felt pad of a printing-frame during exposure to sunshine, the gas rapidly diffuses itself and permeates the paper, as in the well-known ammonia-fuming process. There is, indeed, a remarkable analogy between the two processes; for in both cases *a gas is made to act as sensitiser*, although ammonia, NH_3, only partially fulfils the object here proposed to be effected solely by SbH_3.

The corresponding reaction with arsenietted hydrogen, AsH_3, has been tried, and gives the yellow sulphide of arsenic; but all considerations unite in condemning the prosecution of further experiments in this direction. The gas is extremely poisonous; and the pale yellow colour of the resulting picture renders it of little practical value.

It cannot be said that the antimony process offers at present any substantial advantages; but it is interesting from a scientific point of view, and may yet become available either as a photometric process, as the inventor seems inclined to suggest, or for special purposes where the production of such coloured photographs at a low cost may chance to be a desideratum; at any rate no apology need be offered for bringing the facts of the case to the notice of photographers through the medium of this Society.

John Spiller, F.C.S.

SUPPLEMENTARY PAPER ON GELATINO-BROMIDE.

[A communication to the Edinburgh Photographic Society.]

At the close of my paper on the gelatine process, communicated to the last meeting of your Society, I stated that the discovery had been made that pellicle dissolved in beer produced even more brilliant negatives than the emulsion prepared with water. At that time I had not had an opportunity of experimentalising in this direction. Since then, however, I have been able sufficiently to test the value of the proposed change, and I venture to send a few negatives exemplifying the result. The advantages of beer *versus* water I find to be these:—

1. The emulsion flows readily over even large plates without necessity for the glass rod.
2. The drying takes place more quickly than with the water.
3. The negatives are more brilliant in the shadows, and lose all tendency to fog.
4. Intensity is obtained to any extent with the alkaline developer.
5. Greater latitude of exposure is permissible.
6. A brighter light may be used in the dark room.

The only disadvantages seem to be:—

1. That the pellicle takes a longer time to dissolve in the beer.
2. That the plates are somewhat slower.

The accompanying negatives must not be considered as the best specimens of this process. The portraits have all been taken under great difficulties, since I do not possess either glass room or backgrounds. I think, however, that they sufficiently attest the exceeding value of these dry plates. They enable the photographer to obtain landscapes quite equal in every respect to the best of those yielded by other dry processes; while, at the same time, they permit him to work at portraiture or at interior subjects with exposures less than those with which wet plates could be employed with success.

The negative of a group, which I enclose, is singular in this respect—that the plate on which I took it was prepared a year before it was exposed on Friday last. The lens used was a Ross's doublet for landscapes, of medium angle; the stop was that with the widest aperture; the light was bright, but without sun; and the exposure was fifteen seconds. I have taken the liberty of enclosing half-a-dozen quarter-plates in order that a few of the members of the Society may have an opportunity of testing the process. I have not worked with a portrait lens, and therefore cannot advise as to time of exposure; but I may say this—that with Ross's 5 × 4 doublet and widest aperture I should, for a portrait, give thirty seconds in a good light.

H. J. Palmer, M.A.

* A solution of tartar-emetic poured into the ordinary hydrogen apparatus is equally effective for the preparation of the gas.

FOREIGN NOTES AND NEWS.

Dry Plates without Collodion.—Alum in the Gelatine for Removing the Picture Film from the Glass.—Correction.

The following formula is given in the *Moniteur de la Photographie* for the preparation of dry plates without the use of collodion:—

Albumen	125 grammes.
Honey	110 ,,
Iodide of potassium	4 ,,
Bromide of potassium	1 gramme.
Sea salt	0·3 ,,

Beat the whole into a froth, let it stand for twenty-four hours, then filter. Coat a perfectly-clean plate with this liquid, dry it in the drying-box, and, when cold, sensitise in the usual manner. In this formula the needful addition of water seems to have been overlooked, in consequence of which omission the liquid filters but slowly.

The *Correspondenz* mentions that M. Jean Renaud, in the course of a series of experiments extending over several months, with variously-prepared collodions, found some collodions which resisted being drawn off the glass plate so far as to split up, one-half of the collodion being removed with the gelatine, while the other half still adhered to the glass plate. Many experiments resulted in this way in the loss of valuable matrices. He overcame the difficulty in the following way:—Having fixed the prepared matrice and washed it with acidulated water (seven c. c. of muriatic acid to 100 c. c. of water), it is allowed to dry, after which it is coated with the following solution:—

Alcohol at 40°	75 c. c.
Water	20 ,,
Hydrochloric acid	15 ,,

The solution is poured on at one corner, made to flow across the plate and run off at the opposite corner. This proceeding is repeated with each corner in turn. It is allowed to dry without being washed, and is then ready to be coated with gelatine. The above-mentioned solution can be used for an indefinite time, if the precaution of previously washing the matrice well with dilute muriatic acid be taken, whereby the browning of the alcoholic solution is completely guarded against. With a view to the successful drawing off of the matrice M. Jean Renaud has also made a change in his method of preparing the gelatine. Formerly, for a plate of 27 × 33 centimetres, he used twenty grammes of gelatine dissolved in 100 cubic centimetres of water, and when the gelatine was completely dissolved he added four c. c. of glycerine. He now finds that his object is more easily attained by adding forty c. c. of a two-per-cent. solution of alum. The alum must only be added in the given proportion, for, if more were added, the gelatine would be rendered insoluble and converted into a stringy mass. The addition of alum renders the gelatine insoluble when dry, and prevents dust from adhering to it. It is no longer liable to those needle-pricklike spots which often show in negatives kept in a damp place; and, further, when it is dry it has all the appearance of finely-ground glass, which adds greatly to the softness of the prints. In the original article, published in the *Bulletin de la Societié Français de Photographié* for 1870, it was recommended to coat the gelatine film with a collodion of the following composition:—

Alcohol	100 c. c.
Ether	200 ,,
Glycerine	5 ,,
Pyroxyline	5 grammes.

Whether the addition of alum is suitable for delicate enlargement work, in which there is a great difference of dimensions between the original and the copy, remains to be seen.

Correction.—Having for the moment forgotten that most German chemists still use the old notation, the editorial foot-note in the *Mittheilungen* on Mr. Leon Warnerke's article, given in last week's *Foreign Notes and News*, was puzzling rather than explanatory; further consideration has induced us to think that in the new notation the passage in question should run:—"The blackening is easily explained by the reducing action of the silver salt upon the N_2O_4 (*not* NO_2 nitrous oxide, as it formerly stood) of the pyroxyline and the formation of nitric peroxide, which turns black on becoming dissolved in the bromide of iron." This last appearance—viz., the blackening of nitric peroxide in contact with iron and an acid—is familiar to analytical chemists, and may be the explanation of the phenomenon which puzzled Mr. Warnerke.

Meetings of Societies.

EDINBURGH PHOTOGRAPHIC SOCIETY.

An ordinary meeting of this Society was held in the Hall, 5, St. Andrew-square, on the evening of Wednesday, the 5th inst.,—the President, Dr. Thompson, in the chair.

The minutes of previous meetings were read and approved.

Mr. R. H. Bow read a paper entitled *Further Notes on the Effects of Light on Pigments* [see page 172], and fully illustrated the paper by diagrams and experiments.

The President said the members were always very glad to see Mr. Bow's name in the programme, as his communications were always both interesting and valuable. The paper just read was, he thought, specially interesting at the present time, when so much was being said and written regarding the permanence of pigment printing. Of the permanence of carbon itself there could be no question, but it was now very generally understood that it alone would not give a colour at all pleasing to the eye, requiring, therefore, toning quite as much as a silver print; and, in consequence, the permanence of a carbon print, as a thing of beauty at least, was really dependent on the nature of the colouring matter used to give the desired tone. He would strongly recommend all who were interested in carbon printing, and especially those who were engaged in the manufacture of carbon tissue, to carefully study both the paper read by Mr. Bow that night and the one previously read on a kindred subject.

Mr. Norman Macbeth said there could be no doubt of the value of both of Mr. Bow's papers to carbon printers, and they were equally interesting to artists, to whom the question of the permanence of colours was of the utmost importance. In all such experiments it should be kept in mind that colours were not always what they were represented to be, but were frequently combinations intended to produce the same effect; and in such cases it would be evident that the results could not be depended upon. He quite agreed with Mr. Bow that the medium had considerable influence on the permanence of pigments; but to secure its full effect they must be thoroughly incorporated. He had for some time been using, as a medium and varnish, a preparation of linseed oil, with which he was very much pleased. The ordinary oil was kept at a high temperature—roasted, he might say, for a long period—until on cooling it could be drawn out in threads. In this state it dissolved readily in turpentine, and formed both a medium and varnish of great value.

Dr. Nicol then exhibited and explained the construction and peculiarities of a tent for field work, manufactured and sent for exhibition by Mr. Bainbridge, of Barnard Castle. The tent (Dr. Nicol said), when packed for travelling, measured six feet eight inches by eight inches, and weighed twenty pounds. It consisted of four circular poles or legs hinged to a wooden crown, and kept apart when erected by stays of stout iron wire a little below the middle. On the stays were suspended pockets for bottles, &c., and it was covered by three plies of twilled calico, two black and one yellow. There are no internal fittings of any kind, the operator sitting on the box or basket in which the chemicals, &c., are carried—an arrangement much more convenient than in tents fitted with a shelf and usual appliances. The tent could be put up or taken down in a few seconds, and, therefore, might be removed from place to place with the greatest ease.

Mr. William Neilson thought the tent a first-rate article for those who worked large plates in the field. Its construction was so simple that there was nothing to get out of order, and it was rigid enough to stand unshaken in the stiffest breeze in which a photographer could hope to work successfully.

The President said that the outer covering should be made of waterproof material, as if a shower were to come on and the cloth get soaked it would be exceedingly heavy and troublesome; otherwise the tent seemed very good indeed.

Mr. Ross considered the absence of any attempt at ventilation a serious drawback, as he was quite sure that any one working in it for five minutes during a hot summer's day would not care to repeat the experiment.

Mr. Turnbull was very much pleased with the simplicity and convenience of the tent, especially for the working of large plates. For anything under 12 × 10 it was perhaps just large enough and heavy enough. Mr. George W. Wilson, of Aberdeen, had worked for many years in a tent of very similar construction, but not much more than half the size, and found it answered his purpose admirably.

Dr. Nicol (in reply to Mr. Ross) said that he had for more than a dozen years worked in a Smartt's tent without feeling any inconvenience from want of ventilation. It was provided with a ventilator, but he had not been in the habit of using it, as he found that if the cloth which covered the entrance was thrown back during exposure the tent was kept thoroughly supplied with fresh air. He had several times tried Mr. Bainbridge's tent, and liked it very much. The President's suggestion of a waterproof cover would be an improvement; but it would add much to the cost, which was a serious consideration. He thought that possibly the same result might be gained by giving the outer covering a good rubbing with solid paraffine.

Mr. Dallas then laid on the table a negative, and several prints from it, which he designated "a photographic puzzle." He said that for some time a series of experiments were being made in the natural philosophy laboratory of the University in photographing various spectra, and that while trying to get the spectrum of the electric spark the negative on the table had been produced. In the centre of the plate the spectrum proper appears, but above it and a little to the right there is an abnormal image which appears on that plate only, although a great number of plates had been exposed and developed under identically similar conditions. A print of the abnormal image showed a minute dark centre or nucleus. This is surrounded by a ring of light, then a dark ring, then a broad ring of light, and from that there radiates a series of regular streams of light terminating in brush-like markings, the whole radii being intersected by a series of faint but distinctly visible concentric rings of light and darkness.

The negative and prints were examined with much curiosity, and several suggestions were made, but no satisfactory explanation was elicited.

Dr. Nicol then laid on the table a series of negatives which had been sent by the Rev. H. J. Palmer, along with a short paper [see page 175] which, he (Dr. Nicol) said, might be considered supplementary to that read at the previous meeting of the Society.

The negatives, which included landscapes, portraits, and groups were much admired, and seemed to give encouragement to several members who had been experimenting with gelatine, but who had utterly failed to get sufficient intensity.

Mr. Mathieson said he was very glad to have an opportunity of seeing Mr. Palmer's negatives. He had experimented a good deal with Kennett's pellicle since Mr. Palmer's last paper was read, and while he found the plates extremely rapid—much more so, indeed, than wet collodion—he had utterly failed to intensify them, and had almost resolved to abandon the process. He should, however, try and try again, and take advantage of Dr. Nicol's offer to give him some of the plates so kindly sent by Mr. Palmer.

Mr. Turnbull observed that his experience was like that of Mr. Mathieson. He had tried the plates on portraits in his studio, and found them more rapid than his wet collodion; but the thin image absolutely refused to take sufficient density to make printing possible. Mr. Palmer's negatives, however, had proved that the process could be worked, and that most successfully. He should also try some of the plates so kindly sent, and go at it again.

Votes of thanks were then given to Messrs. Bow, Bainbridge, and Palmer, and the meeting was adjourned.

PHOTOGRAPHERS' BENEVOLENT ASSOCIATION.

The annual general meeting of this Association was held at 174, Fleet-street, on Thursday evening, the 6th inst.,—Mr. M. P. Tench occupying the chair.

The report of the Board of Management was taken as read and adopted, and the managers and other officers were re-elected for the ensuing year.

A petition was presented from an operator who had been previously relieved. The Secretary explained that by the rules the Board could not give relief a second time within twelve months without the consent of a general meeting of subscribers. The applicant was a non-member, and as the Board had recently closed the funds against non-members, the members present were of opinion that the decision of the Board, in this respect, should be upheld, and that as so short a time had elapsed since the applicant had been relieved, the present application should be rejected.

The Secretary appealed to the members present to furnish him with the names and addresses of photographers in their respective neighbourhoods and of their acquaintances, so that copies of the report might be sent to them.

After the disposal of some routine business, and the passing of the usual votes of thanks, the meeting was adjourned.

W. T. Wilkinson, *Sec.*

Correspondence.

April Meeting of the Photographic Society of France.—Death of M. Balard.—Aniline Printing.—Fatty-Ink Proofs.—A New Publication on Fatty-Ink Printing.—Enamels.—Sugar of Lime a Substitute for Carbonates and Liquid Ammonia in Alkaline Development.—Lecture given by M. Janssen.—A New Discovery in Gas Making.

The Photographic Society of France assembled on the 8th instant,—M. Peligot in the chair. The meeting was saddened by the mournful intelligence of the death of M. Balard, the President of the Society—a gentleman well known to fame, an enlightened and enthusiastic amateur, and a benefactor to photography. It was he who discovered

bromine; and we know what service this elementary substance has rendered to our art.

A gentleman named M. Brounet sent a number of portraits to the meeting for examination by the members of the Society. These prints, according to the author, were obtained by a new system of printing invented, as he stated, by him. He described his method to consist of a mixture of aniline colours with bichromate of potash. The specimens sent were very inferior, and the name of Mr. W. Willis, Sen., was mentioned in opposition to his claims.

M. Geymet, the hard-working experimentalist in fatty-ink printing, exhibited specimens of his late experiments, or perhaps it would be more truthful to say work, for he has become proficient in that branch of our art. The prints were excellenlty finished, and admired by all present. When called upon by the President to give the Society a slight idea of his manner of working, and to state if anything were new in his process, M. Geymet said that all the honour of the invention was due to M. Poitevin, and that he had been able to obtain the results now before the Society simply by following his formulæ. In answer to a query as to how many prints he could throw off in a day, he replied "from four to five hundred." This is, indeed, a very satisfactory result, the proofs being about 11 × 18 inches; but what is more interesting to photographers in general is that no patents are in existence to forbid the free use of the process.

M. George Fortier, of whom I spoke in my last communication, has published a very useful book on fatty-ink printing, which it would be of great service for any photographer to consult who intends to purchase licenses for such and such a secret process.

MM. Gougenheim and Forest presented to the Society some very beautifully-finished enamels. The public are, as it were, waking up from their lethargy, and silver prints will not go down with them as formerly; in fact, it is well known that some of the Paris photographers are obliged to pass off silver prints for carbon ones. Meanwhile they are waiting for a favourable moment to learn what they suppose are the difficult manipulations of the carbon process. The public taste is rapidly improving, and indelible proofs are in demand, especially enamels, these being the *ne plus ultra* of photographic skill. A few years since only M. Lafon de Camarsac could be found practising this branch of the art, but at the present moment numerous artists find remunerative occupation in the execution of commissions for photographic enamels.

Our honoured friend, M. Davanne, gave the members the formula for a new chemical to replace, with great advantage, carbonate of ammonia or liquid ammonia for the development of dry plates. It is well known that it is very difficult to procure two samples of carbonate giving the same results; as to liquid ammonia its real strength cannot be easily ascertained. These variations give much trouble, and are the cause of great difficulties in dry-plate work. M. Davanne undertook a series of experiments to find a chemical which would replace either with advantage. He made a saturated solution of lime water, and for every ten ounces he added one ounce of sugar; this, he asserts, is better than either of the chemicals hitherto employed, and the ingredients are very easily procured, as in every town and village of Europe a little sugar and a little lime can be readily obtained. The given quantity of carbonate generally employed can be replaced by the same quantity of the sugar-of-lime solution. The bromide and the pyrogallic acid used need not be changed.

M. Janssen, the celebrated astronomer, gave a description of his voyage to Japan for the purpose of observing the late transit of Venus. He also made a presentation of his photographic "revolver." I will endeavour to give an abridgment of the principal features of his discourse. After having described the object astronomers had in view, he mentioned the difficulties to be met with, and related the history of each person who had contributed to the success of the enterprise. He informed us that the expedition departed from Marseilles on board the steamer "Ava," Captain Fleuriais, and owing to the courtesy of that gentleman the first part of the voyage passed off very agreeably; but on approaching the Chinese seas they had to encounter the hurricane season, and it was their lot to witness, and to struggle against, the most frightful cyclone recorded in history. The havoc caused by this war of the elements was indescribable—desolation reigned on land as well as on the sea. Fifteen hundred natives were drowned, twelve ships foundered, a Spanish ship lost ninety of her passengers as well as the whole of her crew, and it might be said, with truth, that it was owing to the energy and science of the captain that they escaped a watery grave. When calm weather returned the Chinese population could be seen running hither and thither, with an appearance of deep resignation, repairing the ruins in a quiet, unaffected manner—so very different to what might be expected to take place in Europe under similar conditions that it could not but attract the attention of all on board. It was at this moment that the false telegram arrived at Paris—which threw the scientific world into a state of consternation—reporting that the French mission had been "swallowed up by the waves." On landing, the mission was received with the greatest courtesy by the Japanese Government, who did everything in their power to facilitate the operation of the different observations, and even constructed at their own expense a telegraphic line to connect the different stations. Amid great anxiety the members of the expedition waited for the long-looked-for day; for, as the year had been an extraordinarily rainy one, M. Janssen had great fear for the success of the expedition. The morning of the 9th came at last. The weather was pretty fine but cloudy, and in the evening he sent the following telegram to Paris:—

"Transit and contacts obtained and determined by photographic revolver. Fine images in our telescopes; no ligament. Venus seen over sun's corona. Photographs on glass and silver plates. Clouds at intervals. Two members of our mission observed with success at Kobe."

M. Janssen observed that though the weather had not been favourable, and that as many photographs had not been obtained as could have been desired, still the fact of having obtained the two interior contacts—which were the most important—was sufficient to permit them to congatulate themselves upon the results; at least, to be much satisfied that they had succeeded so well in such a difficult operation. The learned astronomer then explained the use and advantages of his photographic "revolver," which, although not an instrument of war, had, nevertheless, made no little noise in the world. Photography, he said, was of enormous value for astronomical observations, for it cleared away the difficulties and the errors which were easily made through optical observation. The great excitement of the astronomer at the moment of the occurrence of the celestial phenomenon is sufficient to account for any errors likely to arise. This gave M. Janssen the idea of replacing human intelligence in such a critical moment by photography, and to produce a series of proofs at regular intervals electrically marked by a chronometer, and as rapidly as possible one after the other. If the operator began a few minutes before the phenomenon and continued a short time after, the exact moment of the contact would be comprised in the series of proofs made. It was by the employment of the rotating disc then before the meeting that he was enabled to obtain the desired result. M. Janssen exhibited to the members the metal discs, as well as the photographs on glass which had been obtained of the transit under such difficult circumstances. These were viewed with great interest, and even more so when it was mentioned that each cost the state at least £1,000!

Good news for gas consumers! A French engineer has invented a new system of distillation in a retort of a new model, which ensures a reduction of at least fifty per cent. in the cost and production of that now necessary article of domestic comfort.

3, *Place Bréda, April* 10, 1876. E. Stebbing, *Prof.*

DRY-PLATE BOXES.

To the Editors.

Gentlemen,—This is a subject on which, I believe, very little has been written, or I expect even thought of. So long as the plates were put into a box of some kind it was thought sufficient that it should be light-tight. This, however, is not all, for the health and longevity, so to speak, of a dry plate depends on the box in which it is to be kept; and as every season is bringing more and more into public notice the comparative merits of wet and dry plates, and causing their different faults and failings to be more closely looked into and commented on, it behoves everyone who knows of a weak point and a remedy to call attention to it.

The season for the dry-plate worker has, I presume, fairly commenced, and I wish to give him a word of caution on the matter of his plate-box. If he wish to keep his plates in good working order, on no account let them be kept in pine-wood boxes, more especially if the boxes be new; for, should he do so, the sensitiveness of the plate will be destroyed—it may be slowly, but it will be surely. It will commence at the edges and work inwards, until the whole plate becomes insensitive. I have no doubt that it has happened that several processes have been abandoned from the supposed bad-keeping qualities of the plates, whereas the fault lay in the box.

It would take up too much of your space to give my own experience and experiments in this matter; suffice it to say that it is the vapour of the turpentine in the wood of the pine that causes a desensitising effect

on the plate. Let those who doubt this try the following simple experiment and report the result:—Place a sensitised plate in a dark slide, but before doing so rub a drop of turpentine into the joint of the shutter—I mean where it turns down when the plate is being exposed; let the plate stay in the back for, say, two hours, then expose and develope, and it will be found that there is a line across the plate opposite the turpentined joint which will not develope. It has been desensitised by the turpentine. On no account let those who sell the boxes persuade the purchaser that the varnish inside will cure this, for it will not; it only makes matters worse, as the edges of the plates abrade the varnish, which forms a fine dust that is very adhesive to the plate, and is likely to result in pinholes.

I find the best wood for the purpose is black walnut or mahogany. Let there be no varnish—simply the wood; the grooves should be clean cut. There will then be no dust or mess on the plates, and however sensitive the plate may be it will retain its sensitiveness indefinitely. It ought always to be borne in mind that the more sensitive to light a plate is the greater is its liability to have that sensitiveness destroyed by the vapours which emanate from pine.—I am, yours, &c.,

8, *Maddox-street, Regent-street, April* 11, 1876. R. KENNETT.

THE DRYING OF GELATINO-BROMIDE PELLICLE.

To the EDITORS.

GENTLEMEN,—I have lately been making a gelatino-bromide emulsion —the proportions as given by Mr. Kennett—and have now got the pellicle, but find a difficulty in getting it to dry, so as to keep it in the dry state ready to dissolve when wanted.

I have had a box made as described by Mr. Gough in the Journal of January 8, 1875; but I am afraid that the ventilation is not quite right. I have put the pellicle in, and on applying the heat under the iron plate the interior of the box in a short time got rather warm, especially at the bottom; at the top it keeps rather cool. My pellicle instead of drying, has began to melt, so I have had to try something else; and, in looking over the Journal I saw a method adopted by Mr. M. Carey Lea, and described by you, viz., drying by putting a flat dish in the drying-box, the dish containing sulphuric acid. So I put some sulphuric acid in my box, and in the morning I found that the pellicle was very much coloured—a slate colour.

I wish to know whether this pellicle will be fit for use, and whether the action of the fumes of sulphuric acid will harm it at all. (I may say that it is not thoroughly dry yet, although I prepared it a week last Saturday.) I am aware that it ought to be dried as soon as possible, and it is not unlikely that the pellicle will suffer from being kept in the moist state so long; but I should like to try and see how it will turn out, and if you can give me any information that will assist me not only in this batch but to guide me in other makings I shall esteem it a great favour. The pellicle is three-sixteenths of an inch thick.

Do you know the diameter of the base for the drying apparatus described by the Rev. H. J. Palmer, and of which a diagram appeared two or three weeks ago; also, the diameter for the inlet for air, and likewise the height?—I am, yours, &c.. GELATINO-BROMIDE.

Hulme, Manchester, April 10, 1876.

[As the subject of the desiccation of gelatino-bromide has not received much attention, we publish this letter in the hope of eliciting from more experienced manipulators the information required. Our correspondent is probably not aware that the preparation of dried pellicle for commercial purposes forms the subject of a patent.—EDS.]

GELATINO-BROMIDE PROCESS.

To the EDITORS.

GENTLEMEN,—With reference to my modified gelatino-bromide process, published in your Journal of March 31st, and to your remarks as to nothing being said of the use of a restraining acid in conjunction with the pyro. and gallic acid: to prevent disappointment, it would, perhaps, be as well to mention that I do not use the *neutral*, but the *common*, crystallised nitrate of silver, which may possibly retain a little free nitric acid, and thus answer the purpose required. I had no other acid. —I am, yours, &c., F. S. K.

95, *London Road, Clapton, April* 10, 1876.

EXPERIMENTS WITH GELATINE EMULSIONS.

To the EDITORS.

GENTLEMEN,—On opening my Journal to-day I find that "Franklin" has been beforehand with me—at least apparently so in his researches—in the use of nitrate of silver in excess in gelatine emulsions. Now, why, oh! why, did not "Franklin" make known his discovery—well, not of the North Pole, but of a fact on which our greatest successes with gelatine emulsions may hinge, and of real importance to gelatine workers? Often, during the last few years, I have noticed this to be the case—that the only safe and sure way of eliciting information is to tread closely on someone else's preserves, when out comes the proprietor to claim his property and to warn off trespassers. This latter act I hold to be perfectly in conformity with a natural feeling which, I presume, we all hold in common; but why does the proprietor, when he has obtained this property at the expense of experimental work, not at once set up his "notice board" to inform as well as warn others that the property is already occupied? If discoverers would act thus the photographic public would not be found delving the fields of more fortunate possessors, in happy ignorance that the fields will bring forth fruit to be reaped by themselves. I know that some do not like "rushing into print," but I think they may well be excused doing so if, from an "inner consciousness," they are aware that they can impart useful and, at least, interesting information to others. I notice that this is "Franklin's" sentiment—at anyrate in part—but why did he not act up to it before? I know that what I have written may appear to be the outcome of an absurd jealousy, somewhat akin to that of the man who persisted that the "ancients" had stolen all his best sayings. This, as I say, would be absurd, and not acting in a spirit of thankfulness to one by whose work we should benefit. This is not my motive; but I am inclined to say to "Franklin"—"better late than never." Neverthelass I cannot do otherwise than tender my thanks to that gentleman for the addition he has made to our knowledge, and trust that he will forgive me this little ebullition. Now to my experiments.

The failure in the mechanical condition of the gelatine (chloro-bromide) emulsion, mentioned in my letter of April 3rd, was, I believe, caused by a coagulation of the albumen, which carried the sensitive salts with it to the surface of the gelatine, leaving the latter clear. I cannot entirely account for this, seeing that the emulsion *appeared* to be all right before washing, which washing should remove the albumen, and prevent any coagulation by heat—supposing that to have been sufficiently intense. At any rate, a second emulsion prepared in the same way did not fail from this cause, and was tried in the camera, against what I shall call "gelatine emulsion *à la* Carey Lea;" both plates were developed together with "Kennett" developer, using half the amount of bromide. The plates appeared equally sensitive—that is, not so sensitive as a "Kennett" plate. The "iodo" plate had a kind of greenish fog after developing, but this seemed to disappear on fixing. The gelatine of both plates was perfectly colourless.

A plate found in my plate-box, and which had been prepared some-time last year, was exposed with them, hoping that it would prove to be a "Kennett" plate; but, on taking it out into the light after development, I found it to be chloride of silver. This plate blistered badly, but the image was the best exposed of the three, and came out rapidly and clear. The plate had been rather thinly coated; and, after washing and taking into the light, it quickly became partially dry—as plates which have been kept long generally do in my experience, the gelatine not swelling to the same extent as in the case of a new plate. On holding it up to the light the following curious effect was noticed, especially when the plate was held close to the eye:—The wet parts transmitted a beautiful *blue* light, and the dry parts an equally well-marked *rose.* The rose-coloured portions could be made to transmit a blue light by again wetting them, and the blue light would be changed for rose on drying. I subsequently found that the thinnest parts of the plate transmitted permanently a bluish light, and that the thickest portions transmitted an orange tint, as is usual, and that these orange-tinted portions, on wetting, became dusky purple rather than blue. Certain portions of the plate transmitted a green light, especially on wetting. It appears that these effects were to be seen on account of the *thin*, uneven coating of the plate. If it had been a perfect plate it would have transmitted only orange rose-coloured light—at least, the effect of dryness and wet would not have been noticed. These effects were also noticed in an undeveloped chloride plate prepared from an emulsion made with excess of silver, and which will be referred to again.

I can only suppose that the thinner the plate the more does it incline to transmit the blue rays; and I suppose the wetting has the effect of making the film thinner, so to speak.* The film was slightly granular, though not to a marked extent. I will send the negative—such as it is—for you to see. Moisten portions of the plate, and mark the effect.

This experience naturally suggests to one that wet and dry chloride plates should be differently affected by light, seeing that different rays are transmitted; but I have not, as yet, found this to be the case. I have never noticed any such effect of colour in a bromide plate. If a plate be more sensitive to the rays it transmits than to those it absorbs—which (as Captain Abney has said) appears the more natural, and seeing that a ray, once absorbed, can have no further action on the silver compound underlying the immediate surface of the film—the fact of a substantial film of chloride transmitting the less refrangible rays would account, apparently, for such a plate being, as I believe it will be acknowledged to be, more sensitive than a thin plate.

But to leave theorising and to return to facts, which will prove of more interest to your readers. I have compared plates by four other emulsions—the first, one of pure bromide, without any chloride, nine grains of cadmium bromide (hydrated), and six grains of ammonium

* This explanation is, I own, "rather queer," seeing that if a thick film can transmit orange light, a thin film, of the same material, should also do the same.—H. B. B.

bromide, sufficient to convert about twenty-two out of the twenty-five grains of silver used, as in Mr. M. Carey Lea's process. The emulsion was made with gum arabic, ten grains to the above proportions of bromides, although, as only six drachms of water were used in the making of the emulsion, the gum must have been thirteen-grains' strong to the ounce. Nor I have not yet proved whether there is any real advantage in using gum arabic for forming the emulsion, neither have I settled the lowest proportions which can be used without forming a coarse precipitate. But there is one advantage at least, and, I believe, one disadvantage—the former is that the emulsion is always fluid, without the necessity of keeping it warm; and the latter is that the gelatine, before washing, does not seem to solidify to such an extent as when it is used alone. But this may be partially or, perhaps, entirely caused by the nitric acid I used—three drops to every twenty-five grains of silver nitrate. I believe the easiest way of washing, especially small quantities of emulsion, is to pour the emulsion into a dish, so as to form a fairly thick film—say one ounce to forty square inches. By this method the water can be drained off with the least trouble and waste of time, which is not always the case when the gelatine is detached from the dish. After washing, the dish may be warmed in another of hot water, and the emulsion run into a filter.

After being sensitised eighteen hours twenty grains of gelatine were added, and, on washing, the emulsion was proved to contain free nitrate. The second plate was one prepared from "Kennett" emulsion, and which is, so far as I know, prepared with soluble bromide in excess. The third plate was a chloride one, with excess of silver (?), sufficient chloride of calcium (just re-fused)* being used to convert sixteen grains of silver, and two drops of *aqua regia.* Twenty grains of silver were used, but in using this proportion I had overlooked the chloride of the *aqua regia;* and, as only half of the above quantity was made, there was really only a theoretical excess of one grain of silver. When I discovered this—not long before adding the rest of the gelatine, only a few grains being used for sensitising—I added nearly a grain more silver in solution. Still I was not able to prove that silver was in excess, as the first washing waters were milky, owing to a certain portion of the emulsion becoming detached; but I have my suspicions that there was not, as the emulsion was not so sensitive as another plate prepared with chloride of calcium to convert sixteen grains of silver, with an excess of chloride. Still, after well washing, I could detect neither chloride or nitrate in the water. The fourth plate was the one mentioned above with excess of chloride.

The four plates were exposed in the camera, with a wide-angle doublet $\frac{f}{30}$, at five p.m.; sun shining; clear sky; exposure, one minute. The subject was one well adapted for showing any difference in the sensitiveness of the plates, which were developed five hours afterwards by the "Kennett" developer, using half the bromide. The "Kennett" plate was decomposed and broke up, but from what I could see it was at least as sensitive as the bromide plate with excess of silver; but the latter developed very cleanly (it had a very bright surface when dry, before development, though the proportion of silver bromide to gelatine was high), and might probably have been developed with much less restraining—or, as it might be called in this case, "destroying"—bromide, and might thus prove the more rapid, practically. In these experiments I have not sought out the best developer for every individual case, believing that one and the same developer should show which is the most rapid plate, irrespective of fog, &c. The image of the above plate was very dense, and appeared to be very satisfactory.

The chloride plate, with silver in excess (?), curiously enough, was less sensitive than that with soluble chloride in excess, which latter was as sensitive—apparently exactly so—as the bromide with silver in excess, but both the chloride plates were much more liable to fog. The chloride plate, silver in excess (?), was curiously speckled, which seems to indicate a fault in the preparation of the emulsion; this, also, makes it appear doubtful whether the experiment with it is trustworthy.

These experiments seem to go to prove that, as I have suspected, silver bromide is not affected by being prepared with silver in excess, that is, not in sensitiveness; but that organic compounds of silver may be formed which will aid in giving density, and thus, in an indirect way, the silver may conduce to produce density of the reduced silver bromide. I notice that "Franklin" does not say more—even so much—for the sensitiveness of his emulsion than Mr. Kennett does for his, which, as I understand, is prepared with excess of bromide. I do not refer to the "extra rapid" plates Mr. Kennett made when first manufacturing for sale, the formula of which has never been published; but Mr. Kennett has told me that *something* is added in the preparation of the emulsion, which makes the plate almost unmanageably sensitive, but a thin plate is usually the result; hence the "something" is probably not silver in excess—perhaps it is chloride of gold. But Mr. Kennett will laugh at me for treating his process like a riddle! As I have said, the "Kennett" process is as sensitive as "Franklin's" appears to be, or my plates either; hence I am inclined to think that we shall not benefit by excess of silver in gelatine emulsions, except as regards density. Altogether, this silver in excess looks promising, as being more manageable in development.

Restraining acid or nitrate being unnecessary with gelatine (this I have not proved myself yet, but I suppose that there can be no doubt on this point) seems to indicate that the real use of acid in a collodion emulsion is to prevent the formation of a fogging organic compound of silver, one of the elements of which is not present in gelatine. I believe this to be a new "notion," and not likely to be looked upon with favour; however, I do not, under the circumstances, see any necessity for supposing the silver bromide itself to be affected by excess of silver nitrate. A collodion emulsion is more sensitive when prepared with excess of silver, I think, on account of the latter acting chemically and mechanically on the pyroxyline.

If gelatine cannot prevent the formation of gallate or tannate of silver, as acids can, why should it be credited with exercising a restraining action on that of the silver nitrate or silver bromide—that is, presuming the action of the nitrate on the silver bromide to be possible?

Many have been the complaints that gelatine emulsions have such uncertain keeping properties, and also that it is impossible to know when an emulsion has reached that stage when a plate prepared with it will blister—at least, short of actual trial. But then this trial plate will take some hours to dry, and then may turn out well; but how about the rest of the emulsion in the bottle? The remaining plates prepared with it are not necessarily identical with the trial plate; decomposition may have set in within those few hours. Again: we procure some pellicle, and keep it, as we consider, in a dry state; but on examination it will generally be found that the shreds of gelatine are not crisp and brittle, as they would be when perfectly dry. The same applies to ordinary, plain gelatine, which is to be used for making emulsions, and also to the "dry" prepared plates. Now, as I say, all these forms of gelatine may be, with more or less propriety, considered "dry;" but they contain some water, as may easily be proved, and where are we to draw the line of immunity from the decomposing effects of water? It may be said—"Nowhere: the slightest trace of water in the gelatine will, in more or less time—perhaps soon—affect the gelatine." But, I think, this can hardly be the case, as, probably, most samples will be found to contain some water. So that there must be a line somewhere, varying, perhaps, under certain conditions; and this fact should point to the necessity of keeping all forms of gelatine in as absolutely dry a state as possible. "But, then, supposing it is not sent out in an anhydrous state by the manufacturer?" Well, I suppose that such a sample would decompose sooner in an emulsion, as the change must be gradual, and would account for one emulsion keeping a much shorter time than another; and for one person complaining that his emulsion did not keep a few hours, and for another being "cock-a-whoop" over his keeping for months. This subtle decomposition does not seem to be perceptible to the sense of smell—not perhaps, even to the man who can "mark" the individual in a room who has lately patronised the shoemaker!

Prevention being better than cure, and cure being perhaps impossible, how shall we best prevent decomposition? Decoction and oil of cloves have both been recommended; and, doubtless, the various antiseptics have been tried, such as carbolic and salicylic acids. However, there is the new antiseptic—thymol—which probably has not been tested. I have now to suggest a new method, but it is only a suggestion: it is to use one of the above substances during the washing of the emulsion and the drying of the plates, and to keep a bottle—say, half filled with emulsion—filled with carbonic dioxide (carbonic acid gas), or the gas dissolved in water, when not in use.

As the decomposition is presumably caused by the action of oxygen, it is possible that the filling up of the bottle with mineral naphtha would tend to preservation. However, I am afraid that the gelatine itself might contain the element of mischief; also, it is possible that, when once it has caught the contagion, the disease will result, even though it be placed out of further harm's way.

Many thanks to Colonel Stuart Wortley for his suggestion; but, if I should get a more sensitive emulsion—which I can hardly suppose could be the case, bearing in mind that Mr. M. Carey Lea, of all men, has investigated the matter—does he also consider the mechanical character of the film would improve? I think it cannot, unless the free iodine, generated on addition of *aqua regia,* almost instantaneously affects the pyroxyline. Indeed, though the iodide of ammonium is the brown, and contains free iodine, I am more inclined to believe the methylated solvents to have had their "fingers in the pie," as mentioned in my last letter.

I am in hopes that Mr. Lea will do me the honour of "treading on the tail of my coat," and of giving me a "good wigging" for not keeping to his instructions; and, finally, let me hope that setting me on my legs again will put me in the way of making a collodion (or gelatine?) emulsion which will "lick" all others.—I am, yours, &c.,

HERBERT B. BERKELEY.

Cotheridge Court, Worcester,
April 10, 1876.

* During drying of the chloride of calcium the smell of chlorine was apparent. Now I am inclined to think that the chloride, when entirely free from chlorine, is less hygroscopic than the commercial preparation (?).

EXCHANGE COLUMN.

No charge is made for inserting these announcements; but in no case do we insert any article merely *offered for sale*, that being done at the small cost of one shilling in our advertising pages. This portion of our columns is devoted to exchanges only. It is imperative that the name of the person proposing the exchange be given (although not necessarily for publication, if a *nom de plume* be thought desirable), otherwise the notice will not appear.

The following articles are offered in exchange for a whole-plate or cabinet lens by Dallmeyer or Ross:—20 × 16 bellows camera, half-plate lens; whole-plate lens by Jamin, and whole-plate mahogany camera. Difference adjusted.—Address, H. Watson, High-street, West Bromwich.

ANSWERS TO CORRESPONDENTS.

Photographs Registered—

William Kirk, Walthamstow.—*Floral Border Design for Phothographs.*

H. Sampson, Southport.—*View of Conservatory and Bridge, in Churchtown Botanic Gardens.*

J. Thomson, Liverpool.—*Portrait of Mr. Joseph Malins (G. W. Chief Templar) and Portrait of Mrs. or "Mother" Stewart.*

Theodore Cook, Clifton.—*Eleven Photographs entitled, respectively, The Croquet Bears, The Introduction, The Blind Bear, The Shuttlecock Bears, The Awkward Squad Bears, The Deaf Bear, The High-Art Bears, The Scolding Bear, The Progressive Bears, The Minstrel Bears, and The Barberous Bears.*

☞ *Correspondents should never write on both sides of the paper.*

Notice.—Each correspondent is required to enclose his name and address, although not necessarily for publication. Communications may, when thought desirable, appear under a *nom de plume* as hitherto, or, by preference, under three letters of the alphabet. Such signatures as "Constant Reader," "Subscriber," &c., should be avoided. Correspondents not conforming to this rule will therefore understand the reason for the omission of their communications.

Faber.—There is no such leakage as that anticipated.

R. W. A.—Received. Your note will be shown to some interested friends.

T. Johnson (Leicester).—Thanks for the elegant circular. It is very neat.

Interceptor (Bridge of Allan), and H. B. B.—Nothing can be done till after the Easter holidays.

J. Harrison.—The formula is very similar to that published by Captain Abney in March last year. It was very kind of you to obtain it.

H. R. B.—The picture entitled *Stolen Moments* is the production of Mr. J. Hubbard, of Oxford-street. It was produced over four years since.

Franklin.—We have received a communication from "Franklin," in which he gives a new formula for the development of gelatine plates. This in our next.

Geo. Whiteman.—Your "discovery" of the possibility of taking photographs by means of the large lens, or objective, of an opera-glass is one that has been made long ago by others. Very fine photographs may often be obtained by a lens of this description.

Jehu.—The longest focus is the best. Indeed it would be still better if you could obtain a lens three or four inches longer than that marked "B," or say from twenty-eight to thirty inches focal length. Perfect achromatism is not required for the purpose for which it is intended.

B. W. M.—With the exception of your having allowed too small space for the dark room the designs for the new studio are good. It will be quite easy at this stage of its progress to add three feet more to the length of the dark room, the width of which is sufficient for every purpose. The size of the yellow window may also be increased with advantage.

J. B. Wright.—The best glass for glazing the studio is a common, thin window glass of a slightly-greenish colour, the dimensions of the panes being large. The objection to the sample which you enclose is that, although it is colourless at present, it will most probably darken to such an extent in the course of a year or two as to obstruct to a serious extent the passage of the chemical rays. The glass which we recommend has not that tendency.

Henry Collen.—This veteran photographer and artist has sent us an account of a successful attempt made by him to obtain photographs of the "odic flames" from magnets. Having to go to press a day earlier than usual we are not able this week to give the description of this very interesting feat, more especially as at the time we despatch this for press we have not received some illustrative specimens which Mr. Collen has promised to send.

Aurum.—Although most of the articles manufactured in vulcanised rubber are made from rubber with which sulphur has been mechanically mixed in a masticator, yet it is not difficult to vulcanise rubber by chemical means after it has been formed into the desired shape. Let it be immersed, for about a minute, in a solution of protochloride of sulphur in sulphide of carbon, the strength of the solution being two and a-half parts of the former to one hundred parts of the latter. Another method has been strongly recommended by Mr. Parkes as being specially applicable to small articles, namely, immersing the articles for three hours in a close vessel containing a solution of polysulphuret of potassium of the specific gravity of 1·197 and of the temperature of 240° Fah. It is afterwards washed—first in alkaline water, then in common water—and dried.

X. Y. Z.—We cannot hold ourselves responsible for the *bonâ fides* of announcements appearing in our advertising pages, but we are in a position to attest the respectability of the advertiser you have named.

Spirit Photography.—Several correspondents have written to us on the subject of "spirit" photographs, having apparently been stimulated to this course by the recent remarks of Dr. Nicol and the "Peripatetic Photographer" on the subject. Some express unqualified belief in the reality of spirit photography, and others express their belief in an equally strong manner in the imposture theory, but in no case has any correspondent supported his creed with his name and address. Till this is done we shall take no further cognisance of the subject.

XX. (Paris).—1. Had you delayed writing your letter for twelve hours after making the collodion you would not have had occasion to complain of the intense redness of the colour. All collodions made in the same manner as yours, and with methylated solvents, invariably become of a deep red colour at first, but they as invariably become quite colourless after standing for a few hours.—2. We are not acquainted with the name of the manufacturer of the French camera which we recently described as having been imported by Mr. Atkinson; but, so far as we can learn, no patent exists in connection with it—certainly not in this country. A good general idea of the action of the plunger, by which the plates are brought up from the reservoir into the camera, may be obtained from a careful perusal of Mr. Aird's paper, published in page 123 of our volume for last year.

J. E. G.—Writes—"1. I have several stereo. negatives taken with a pair of lenses and wish to copy them as transparencies for the stereoscope. Shall I have to use a pair of lenses? or a single lens as in copying an ordinary negative?—2. Is there a process by which I can produce a printing block to set up with ordinary type from a negative in half-tone?"——In reply:—1. When a stereoscopic negative has been obtained in a binocular camera with a *pair* of lenses, it is necessary that in the production of a transparency *each* half shall be reversed. This necessitates the employment of a copying camera having two lenses. If the negative had been obtained by means of a camera acting on the principle associated with the name of Mr. Latimer Clark it would have been necessary to employ one lens only in the copying camera. We have frequently recommended the use of only one lens in the stereoscopic negative camera under circumstances in which the photographer had not a pair which matched each other properly, a sliding front to the camera being necessary so as to allow of first one and then the other half of the plate being exposed. When producing a transparency from a negative obtained under these circumstances, it is necessary that the copying camera have two lenses, just as if the negative had been taken by a bi-lens camera. —2. It is probable that one of the typographic processes described in our Almanac will answer the purpose.

M. Noton.—Our correspondent expresses a desire that we should publish the correspondence between Mr. Young and himself forwarded to us by the former gentleman; but, after due consideration, we think it better not to do so. We give, however, an extract from Mr. Noton's letter to ourselves, as it bears upon the points at issue. He says:—"When I put it to Mr. Young to tell us what the several articles were he had patented, it was not to satisfy any curiosity I had, but to do an act of justice to the members, and clear away the deception which had been practised upon them. I am not certain when I spoke, or what it was I may have said, to Mr. Young in conversation about the oxygen machine; but I say now that an inventor should consider first if it be worth his while to sink a sum of money upon an article of limited use. 'Discretion is the better part of valour;' and if the result of a mature study of the probabilities of making a profit, or even of getting his money back again, is doubtful, he had better not go in for a patent which will die out, as hundreds do, but give it freely to the public and have his name always honourably mentioned with it ever after. Mr. Noton does not feel that his apparatus is put in the shade, nor is it a 'pet,' but an article of utility in work more extensively than Mr. Young is aware of. Anyone reading the report at page 82 of this Journal, and comparing it with my paper published in 1868, page 100, will see Mr. Young is praising both together, so that if I have lost confidence, as he says I have, he must have found it somewhere! At all events, I hope he will not credit me with proposing to make a *portable* oxygen machine for forty lime lights, or be able to put a cylinder fifteen inches diameter on a square foot of floor; or, that a pennyworth of oxygen will make a fully-exposed enlargement."

☞ Editorial Communications should be addressed to "THE EDITORS"—Advertisements and Business Letters to "THE PUBLISHER"—at the Offices, 2, York-Street, Covent Garden, London, W.C.

METEOROLOGICAL REPORT,

For the Week ending April 11, 1876.

Observations taken at 406, Strand, by J. H. Steward, Optician.

These Observations are Taken at 8.30 A.M.

April.	Bar.	Wind.	Wet Bulb.	Dry Bulb.	Max. Tem.	Min. Tem.	Remarks
6	30·42	E	51	54	62	52	Dull
7	30·40	E	49	51	64	50	Cloudy
8	30·12	SE	49	53	71	44	Bright
10	29·58	SW	49	52	53	47	Cloudy
11	29·62	W	37	41	49	35	Cloudy

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THE BRITISH

JOURNAL OF PHOTOGRAPHY.

No. 833. Vol. XXIII.—APRIL 21, 1876.

ON PRINTING OPALOTYPES.

Now that photographers, both professional and amateur, as well as the public in general have fully recognised the beauty of this style of picture, we propose, in reply to the numerous inquiries which are being continually received, to say a few words upon the various methods adopted in their production. Several processes have been, and may be, successfully employed, and it will rest with our readers to select the one which may best meet their individual requirements.

The glass which forms the basis of the picture was, until within the last few years, very difficult to obtain of the proper quality and suitable for the production of the finest results; but now, thanks to the demand which has arisen, as well as the commercial enterprise which has kept pace with that demand, it may be procured with the greatest ease and at a very moderate cost. There are two descriptions in the market, namely, "pot opal" and "flashed opal," the former, as its name implies, being of a homogeneous composition throughout its whole thickness, while the latter is made by "flashing" a thin film of the opal "metal" upon one surface of a sheet of ordinary colourless glass. The last-named should be chosen for photographic purposes, as the "pot opal," from its translucent character, gives an appearance of "fuzziness" to the picture, which presents the effect of being sunk into the body of the glass. The thin film of denser opal, however, arrests the rays of light at once, and keeps the image, so to say, upon the surface, thus conducing to greater sharpness and brilliancy. Care should be exercised that the image is formed upon the flashed side, or the result will be even less satisfactory than if the pot metal be used.

A substitute for opal glass, which has been strongly recommended, consists in coating a plate of ordinary glass with gelatine containing oxide of zinc in suspension in a state of very fine division. It is scarcely necessary to give any exact proportions, as the quantity of white pigment may be altered to suit various requirements, but the gelatine should be used in the proportion of about twenty grains to the ounce of water. The oxide of zinc should be triturated in a mortar with water and a little glycerine, after which it is squeezed through a couple of thicknesses of fine calico or linen, in order to remove the coarser particles; it is then gradually stirred into the warm gelatine and again strained. The gelatine should be clarified by mixing it with a little albumen and raising it to the boiling point of water, when the albumen will be coagulated, carrying down with it any impurities which may be present.

One advantage of this method is that a slight tint may be given to the opal surface according to the taste of the operator, as one of the complaints raised against the opal glass of commerce is that it is too cold in tone. It is, however, merely a matter of taste, and, while some may prefer the pure white, others are in favour of a pink, cream, or faint blue tint. These may be easily produced by the use of suitable colouring matter in connection with the zinc-white, care being taken not to spoil the effect by making it too pronounced. Though not absolutely necessary, it is better to render the gelatine surface insoluble, for which purpose a solution of common alum is as good as anything. The operation may be performed either before drying the opal film or after the production of the picture, while if a dry plate be prepared with tannin as the organifier the latter will produce the desired effect without any further treatment.

The processes in general use may be divided into three classes, each of which finds its own supporters. First, the method of printing direct, without development; second, printing in the camera upon a wet (or dry) plate, which offers the advantage of rendering it possible to reduce or enlarge the proof; third, printing upon a dry plate by superposition and development; fourth, printing in carbon. Each has its special advantages, and by careful treatment may be made to produce equally good results.

In the first instance we are limited to two processes—the collodio-chloride and the now almost forgotten "Wothlytype." The former is generally used, but it has had laid to its charge that it gives pictures lacking vigour and difficult to tone, while the tones are said to be too cold; the uranium process is also stated to be liable to similar defects. The great advantages of this style of printing are that the progress of the printing may be watched, the manipulations are easy, and there is very little fear of the stains or other irregularities frequently met with in developed pictures. A formula which we have used with success consists of a sort of cross between collodio-chloride and Wothlytype; it is as follows:—

Ether (saturated with nitrate of uranium)...	$\frac{1}{2}$ ounce.
Alcohol	$\frac{1}{2}$,,
Pyroxyline	6 grains.
Chloride of ammonium..........................	3 ,,
Nitro-glucose	$1\frac{1}{2}$ grain.
Nitrate of silver....................................	16 grains.
Castor oil	2 drops.

The pyroxyline should be of a medium character—neither too horny nor too powdery; that made with weak acids at a low temperature being suitable. The ether and alcohol should be allowed to stand for some time after the uranium has been dissolved, and then filtered clear of any deposit which may occur. In the case of the ethereal solution, in all probability a considerable quantity of water (extracted from the uranium salt) will be found to collect at the bottom of the vessel, in which case the supernatant liquor must be carefully decanted. The mixture is made in the same manner as an ordinary emulsion, the silver being added last, dissolved in about ten drops of water by means of heat, and the whole allowed to stand for at least twenty-four hours. If greater vigour be desirable a grain or so of citric acid may be added; and if the shadows want clearness or seem to be sunk into the glass the quantity of silver nitrate must be reduced.

This emulsion prints rapidly, the image upon coming out of the frame being of a warm brown, which changes, upon wetting it, to a more "foxy" colour. After washing in one or two changes of water the picture is toned in any of the ordinary toning baths used for paper; but we prefer either the acetate or phosphate solution, the former giving a warmer tone. Very little over-printing is necessary, but this will vary with different samples of pyroxyline, some of which appear to lose nearly the whole of the image during toning and fixing. The fixing solution consists of a fresh solution of hyposulphite of soda, in the proportion of four ounces to the pint of water, with a grain or two of carbonate of ammonia.

This method recommends itself principally on account of the simplicity of its manipulations, which are in every way identical with the ordinary course of silver printing upon paper, and for that reason will find favour with many; but others may possibly raise a question as to the permanence of the results, which, in the present state of public feeling, it would be difficult to answer favourably, hence, perhaps, one of the processes still to be described might be preferred.

With regard to the wet process in the camera (which will be used more generally by professional photographers than by amateurs) we need say little beyond this—that every means must be used to secure a combination of cleanness, softness, and vigour. The first and last may be easily secured, but often at the expense of softness. To obtain the latter a full exposure must be given, and a tolerably powerful, but well restrained, developer employed, when, if the bath be in good order and the collodion of a suitable character, very little difficulty will be experienced. As we have remarked, the employment of the camera gives an advantage not possessed by any of the methods of printing by superposition, and this will be sufficient to render that course useful in special cases, even if it be not altogether adopted.

The third plan spoken of is that of printing upon a dry plate by superposition. The chief question affecting this is the selection of the process to be employed; and certainly a very large choice is offered. It is not, however, a question of which is the best process in the same light as we should apply the question were the object the production of landscapes; we may leave out of consideration the sensitiveness of the process and confine ourselves to the selection of one which is certain in its result, clean, and easy of manipulation. The only difficulty in this case arises from the wideness of the range of choice; probably each individual may have a particular process or a particular preservative which will produce results equal to any other. We prefer, perhaps from old use, one of the older forms of collodio-bromide emulsion prepared with excess of soluble bromide. Such an emulsion, though slower than we are accustomed to use for landscape work, will be found, for the purpose in view, to produce better results and with much less trouble than the more rapid processes now in vogue.

Whatever process may be chosen, the same or similar rules hold good with regard to exposure or development—a full exposure and a well-restrained developer. By this means the detail is brought out without rendering the shadows either harsh or heavy—the two great defects to be avoided. No forcing out of under-exposed images can be expected to result in anything but failure, or at least inferior results. If alkaline development be used, let the treatment with ammonia be stopped *as soon as the details are out*, and, after a thorough washing of the film, proceed to intensify by means of silver. This will give, if properly done, a much finer and more delicate, but at the same time more vigorous, result than can be secured with ammonia intensification, which almost inevitably renders the shadows heavy and destroys the purity of the whites.

The last method we shall mention is one which is capable of producing the very highest class of results with, perhaps, the minimum of trouble; we allude to the process of printing in carbon. Many of our readers who have not tried carbon printing will, perhaps, be frightened at the mere name; but we can assure them that their fears are groundless. We only state a fact in saying that it will be found the simplest and easiest plan yet mentioned. The facilities which are now afforded in the way of supplying the carbon tissue commercially remove any difficulties which might at one time have been urged against this method. The tissue is sunned in the usual manner, and soaked for a short time in cold water; the glass, previously prepared with a film of insoluble gelatine (the artificial opal mixture we have described answers the purpose), is also dipped into the water, and the two surfaces being brought into contact by means of the squeegee, the picture is developed in the usual way. The only objection we can imagine may be urged against this process is that the images so obtained are reversed; this is obviated by the use of a pellicular negative, or, at the expense of a little more trouble, by the adoption of the double transfer process.

We have purposely omitted saying anything upon the subject of toning in connection with the developed images, as it is so obviously necessary, and the operation so well known; but we think it may be well to say that, where the tones produced by gold are found to be too cold, chloride of copper may be used to produce any desired effect, from warm brown to neutral black. The mode of using it has been recently described, so we need not here repeat it.

The foregoing does not profess to include the whole of the methods employed for the production of opalotypes, or even, perhaps, the best; but we can recommend the processes here described as extremely simple in manipulation, and capable of producing very high-class results.

EXPLOSIVE *MATÉRIEL* ON ITS TRIAL.

At the Bow-street Police Office, on Saturday last, a large portion of the day was occupied in the hearing of a case in which photographers and dealers in photographic materials must feel an unusual degree of interest. A gentleman, an amateur photographer, was about to proceed to Bombay *viâ* Venice, and desiring to take with him his camera and the necessary *matériel* for practising the wet collodion process inquired if he might take a few photographic chemicals with his luggage. The reply was unsatisfactory, for the Peninsular and Oriental Steam Navigation Company's boats do not carry anything of an explosive nature, and it was pointed out to the intending passenger (Mr. H. W. Johnson) that both ether and collodion would certainly come under that category. Mr. Johnson, however, managed to get the photographic packages put away among his baggage without declaring what they contained, but, as ill luck would have it, an accident happened to his luggage at the London station for Southampton whereby a bottle was broken, and the nature of its contents thus became revealed. Ample details of the action that ensued will be found in another page; it is sufficient here to remark that Mr. Johnson, in addition to the annoyance and expenses caused by having to delay his intended Indian voyage, has had to pay the sum of eighty pounds by way of fine and costs.

Of a truth some photographers have yet much to learn. From the moral point of view the route, mode of transit, insurance, and conditions of carriage of collodion should have been duly ascertained and conformed to, and its nature, as well as that of the other photographic chemicals of an explosive nature (such as alcohol), duly declared. This might have involved a somewhat enhanced pecuniary outlay, and be attended with "fuss" and delay; but it would have ensured safety. From the mechanical point of view we discover in this case a serious lack of worldly wisdom. Could it be possible that Mr. Johnson had never stood on the platform of any of our principal railways and witnessed, as we have done, the recklessness displayed by railway porters with respect to the nature of the boxes or packages pitched, hurry-scurry, from one to another? For many years we had innocently considered it almost libellous, as regards railway porters, to harbour the thought that they took a kind of fiendish pleasure in testing by collision or percussion the strength and endurance of such packages as passed through their hands; but, from what we have lately observed, such opinion is now greatly modified.

Those who send photographic chemicals by railway should so pack them as to permit, if necessary, their sustaining, uninjured, a fall from the top of a huge pile of goods on a wheelbarrow down upon a stony pavement. To ensure such immunity the bottles containing collodion should be packed in a tin case well filled with a mixture of sand and sawdust, the top of the case being afterwards soldered on. By the adoption of this method, and placing the case in a stout wooden box, the probability is that by no amount of carelessness on the part of railway porters could collodion bottles be broken, while it is certain that, if such an accident did befall them, their contents would not so escape as either to reveal the nature of the enclosure or to endanger by fire or explosion such goods as happened to be in the vicinity.

But events are rapidly transpiring by which risks in connection with the transit by railway of collodion, or subterfuges considered the necessary accompaniment of the shipment of that material to India, may be minimised, if not altogether prevented; we mean the substitution of gelatine for collodion. This latter substance, we unhesitatingly admit, possesses many peculiar advantages; that it possesses some *dis*advantages the unfortunate defendant in the case to which we

have referred will as readily admit. Having an intimate acquaintance with the subject we say that for every purpose to which an amateur photographer can desire to apply sensitive plates gelatine may be made to take the place of collodion. With respect to facility of preparation, gelatine plates are scarcely, if at all, inferior to those prepared by collodion; in quality the results are nearly on a par; and in sensitiveness *dry* gelatine is quite equal to *wet* collodion. It is long since there ceased to be any secret in connection with the preparation of gelatine plates, which, although slow, yield good pictures.

The secret of extreme rapidity is gradually oozing out and becoming revealed, as must become apparent to those who will have read the valuable communications, from "Franklin" and Mr. J. King, which have appeared in the two previous numbers as well as in the present issue of this Journal. The former of these correspondents ("Franklin") handed to us, at the very time the collodion case was being adjudicated upon in the Police Court in the street adjoining our office, a negative which, when rightly looked at, will go very far indeed to indicate the advanced stage achieved in this direction. It is an instantaneous view of a scene at a railway station, taken by a landscape lens having a stop sufficiently small to ensure sharpness at the margin as well as at the centre, together with great depth of definition. The plate was a dry one, its keeping properties were presumably quite equal to those of any others, while as regards exposure it was treated as though it had been a plate prepared by the wet collodion process. A secret process? Nay, it was prepared and developed according to the formulæ presented to every reader of this Journal, and every intelligent photographer may prepare for himself plates possessing the same degree of sensitiveness. To render the emulsion itself always fresh and ready for use it is only requisite that it be dried and converted into the pellicular or pulverised form, in which form there is no limit to its keeping properties, provided it be completely shaded from the light.

A writer in a recent number of a favourite quarterly (the *Popular Science Review*) directs attention to the great convenience accruing to the photographer about to visit foreign lands who takes with him emulsion instead of collodion:—"When the photographic visitor to the continent takes with him a supply of dried plates he runs a risk of having them spoilt by the examination, in daylight, of the custom-house officials. When he takes with him only a bottle of emulsion this danger is reduced to a minimum, especially if the bottle be actinically opaque. But by taking with him, instead of these, a supply of the sensitive collodion in the form of a coarse powder he secures the maximum of convenience without any risk whatever. To prepare a solution for use a certain proportion of this powder is added to a mixture of ether and alcohol, in which it is dissolved; and thus is made a collodion fit for immediate use." But in the case of the collodio-bromide pellicle here spoken of ether and alcohol are required; in that of the gelatino-bromide nothing is necessary but ordinary water.

For those, therefore, who desire to practise photography in India, and who are unable to take out with them a supply of collodion or to make their own collodion, including the solvents, when they have arrived at their journey's end gelatine emulsion, prepared either fresh or from the dried pellicle, affords a means of escape from all their troubles. We feel assured that the present season will not terminate without seeing the gelatino-bromide process completely acknowledged to be one conferring, in no stinted degree, on all the best dry collodion processes the sensitiveness and certainty of wet collodion. The admirable property of collodion, namely, its "setting" within a few seconds after it has been poured out upon the glass plate we fully recognise; in the absence of this quality gelatine is not worse than albumen, while it possesses important advantages over both. It remains for the intelligent experimentalist to fully develope these advantages.

THE INFLUENCE OF VARIOUS MOUNTANTS ON THE PERMANENCE OF PHOTOGRAPHS.

The question of the permanence of silver prints—always one of the utmost importance—has, in consequence of the impetus given to pigment printing during the past few months, attracted a larger measure of attention and been the subject of much keener discussion than at any former period. Anyone who will take the trouble to carefully read what has been written in connection with this subject cannot fail to be struck with the diversity of opinions, founded apparently on personal experience, as to the actual state of the matter.

From the mass of conflicting opinions one or two things can be readily accepted as clearly ascertained facts; that is, that some silver prints are, after a period of nearly a quarter of a century apparently as brilliant as when they were made, while others that had been produced in, so far as can be ascertained, the same way have given indications of a tendency to fade in less than a tenth of that period. It is also well known that some of this fading is due to the imperfect removal of the hyposulphite of soda used in fixing, and some to the use of the salt after decomposition had commenced, in consequence of which sulphur or insoluble sulphides were deposited in the paper, their action on the silver of which the image is formed bringing about its destruction. Minute traces of hyposulphite of soda in the mounting boards are still believed in by some photographers as a source of fading, although we showed in a former article that an examination of the process of paper manufacture, as generally carried on, made it evident that the fraction of a grain which it was possible to conceive might remain in many pounds of pulp was altogether inadequate to exercise any influence whatever, and that where the salt had been supposed to have been detected the reaction had been brought about by traces of sulphurous acid used in the preparation of the size.

Allowing, however, for all these causes, there are still numerous cases of undoubted fading that cannot be attributed to either; therefore the mounting material has come in for a share of suspicion, and several correspondents have recently expressed a wish that some experiments might be undertaken in this direction. Acting on the hints thus given we now publish the results of a series of such experiments commenced nearly two years ago, but which at that time we did not intend to finish till at least twice that period had elapsed.

Sometime in May, 1874, in consequence of some correspondence regarding the influence of mountants, we resolved to put several of those most generally used to the test of actual experiment. For this purpose we printed a number of proofs from an average good 11 × 9 negative, one half of which was fixed in a fresh solution of hyposulphite of soda, and the other in a solution that had been several times used, and which had left a black deposit on the sides of the bottle in which it was contained. The prints had been fully toned to a purple-brown of a rather dark shade, and were washed for eight hours in an automatic washing-machine, in which the water was changed every fifteen minutes, allowing five minutes to drain after each change. The prints were then sponged to remove any deposit that might have been made, pressed between folds of blotting-paper, and at once mounted on boards which, on examination, gave no indication of the presence of either hyposulphite of soda or sulphurous acid. The mountants selected were starch freshly made, starch that had been standing for some days, dextrine, gum arabic, flour paste, rubber solution, and glue both dissolved in water and in methylated spirits. Those mounted with rubber, we may say, were of course dried before the application of the solution. One batch of the prints was mounted each with one kind of mountant, while another was coated in quarters with different pastes. The whole, after being pressed, were put into simple gilt bead frames, but not protected by pasting in, in the ordinary way, the object being to let the atmosphere have free ingress and egress. They were hung in a room having a southern aspect, and where the sun had free access for a number of hours each day. In that position they have remained from the date already given till now, when they have just been removed for a careful examination and comparison with a set of unmounted prints, securely kept in a portfolio for that purpose.

And, first, as to those that had been fixed in the old hypo. solution. Contrary to the now generally-received belief, they have not all faded, nor show any tendency to yellowness in the whites. Those mounted with rubber, glue, or fresh starch are still white, and in every respect equal to the unmounted and more carefully-preserved specimens; but those to which dextrine and gum had been applied

are quite yellow, while the old starch is not only yellow but considerably wanting in the delicate half-tone by which the others are characterised. The same observation applies with equal force to the print mounted with flour paste. Of the prints fixed in fresh hypo. solution only three show any tendency to fade, and that is only seen in little more than a perceptible yellowish tint in the white skies. These are the flour paste, old starch, and dextrine. All the others are quite as brilliant and pure as the unmounted proofs. We may say that this, so far as the dextrine is concerned, was contrary to our expectation, as we had always hitherto considered the latter a very suitable and most convenient mountant.

Portions of each print and mount were then cut up and soaked for some time in test tubes with distilled water, and on the application of litmus paper the old starch, flour paste, and dextrine gave decided indications of the presence of acid, which was not detected in any of the others; but the gum and rubber showed at some of the corners a want of adhesion, the latter especially admitting of easy removal from the mount.

On the whole, we think the result of the experiments, so far as they go, shows clearly that freshly-made starch, paste, and glue, either in watery or alcoholic solution, may be thoroughly relied on as safe mountants, and that when fading occurs in prints mounted with either of these substances it may fairly be concluded that it has not been caused by the mounting material.

We are aware, of course, that such a negative conclusion does not help to indicate the true cause of fading; but it is quite evident that the greater the number of probable causes that we can eliminate the more nearly will we approach to a solution of the difficulty which has so long been a puzzle to the experimentalist in silver printing.

Our contributor "Franklin" appears to have taken up the gelatino-bromide process in earnest, and promises to add much to the knowledge hitherto possessed on the subject. His experiments detailed in another column will prove useful to many gelatine workers, and we may be permitted to append a few additional remarks. The energy of the developing action of the alkaline pyro. depends entirely upon the proportionate alkalinity of the solution; that is to say, it is greater in proportion as the amount of alkali (whatever it may be) is increased, both as regards rapidity of development and density of deposit. But in using ammonia it must be borne in mind that another action is at work in addition to that of development, free ammonia being a solvent of bromide of silver and, to a small extent, of the newly-formed image; hence, if it be added too rapidly or in too large a proportion, its solvent effect commences to act against the development, and the result is a weak image which refuses to intensify. Carbonate of ammonia possesses no such solvent effect, or, if it do, it is due to the presence of free ammonia; for this reason a much more strongly alkaline solution of that salt may be used than is possible if the more energetic hydrate be employed. But the carbonate upon exposure to the atmosphere becomes reduced to the bicarbonate with evolution of ammonia, and its solution gradually loses its developing power. This latter fact, or the employment of an old sample of carbonate, may account for the want of energy experienced by our correspondent. The gradual evolution of ammonia from the carbonate solution probably accounts for its regularity of action, and we have frequently remarked the power it possesses of giving great density where the hydrate failed, though the latter is far more energetic. By increasing the strength of the solution it is probable that the apparent lengthening of the exposure observed by "Franklin" would be obviated.

DEVELOPMENT OF GELATINO-BROMIDE PLATES.

I have always entertained the highest respect for Mr. Kennett's abilities and patience in producing the most rapid dry plates known, and also what until recently I had thought to be the best formula for developing the same. Had he known that his emulsion was right, to arrive at a developer would have been comparatively easy, or, if he had always in his experiments been certain that his proportions of alkali, bromide, and pyro. were the best possible, it would have greatly assisted him in his emulsions. But, with no reliable precedents to guide him, to have worked out so valuable a process is an achievement to be proud of.

Some time since I tried many modifications of liquor-ammonia developer, but with indifferent success. I finally concluded that Mr. Kennett had the proportions about right. The only variations I have made from his instructions have been the use of an alcoholic solution of pyro., and (being fond of dropping-bottles) making my mixture of ammonia and bromide eight times as strong as he recommends, using only one-eighth of the bulk to the ounce of pyro. solution.

I once asked a friend who worked gelatine if he had tried carbonate of ammonia for developing gelatine plates. He replied that he had, but that it frilled the edges. I rested content with his experience, but that was a mistake, as I now know.

Here let me interpolate a word as to frilled edges. These are caused by—1. Having an alkali and an acid in the plate at the same time. Remedy: wash thoroughly before redevelopment. 2. Too strong a solution of acid pyro. for intensifying. 3. Gelatine spoiled by heat. In making the emulsion, and when redissolving after washing, never have the water in which the bottle is put so hot as to scald the finger if held in it five or six seconds; and, finally, let the plate, when coated, have the chill just taken off—not made hot—and there will be no trouble with frilled edges.

A gelatine plate should be developed by reflected light, the film generally being too opaque to judge of detail by transmitted light. I have never been able to build up my gelatine negatives in the same way that Liverpool plates can be developed. I always found that the gradual addition of ammonia and bromide would produce a flat, weak picture, even if the exposure had been right. If, after the detail was out, bromide were added to restrain development, the image would not go on gathering density, but would stop about as it was; the developer would discolour and stain the film, and the whole result prove unsatisfactory. I have always used, at the outset, a strong developer, and if the exposure were right the high lights would quickly turn very black and be in sharp contrast with little patches of brilliant white representing the shadows. If these shadows begin to discolour quickly the plate is over-exposed, and, usually, beyond intensification. An over-exposed gelatine plate developed with ammonic-hydrate will not take silver kindly by any means I have ever tried.

The great difficulty in the development has been want of control. If commenced carefully, and the plate be over-exposed, there is very little use in trying to save it; and, if under-exposed, forcing stains the film. Go at it boldly, and, if properly timed, beautiful negatives will result; but if timed wrongly the negatives will be wrong, and that is an end of it. To go out with your camera backs filled with gelatine plates under such circumstances is not a cheerful occupation; and many times when I have been asked—"Well, what did you get?" I have had to ejaculate, with a sigh—"Nothing." I have some beautiful gelatine negatives, but I have washed off acres of gelatine films. I hope to do better in future, for I have learned something.

Recently, when poring over your Almanac without any particular object, I read Canon Beechey's article, and was struck by his great objection to liquor ammonia; so I thought I would try the carbonate for gelatine, and bought some.

Now, this is what I did, and what I had to do it with:—I had a box of plates prepared according to my formula given last week. On the shelf over the sink were bottles containing one hundred-grain-per-ounce solution of pyrogallic acid, ten-grain solution of bromide of potassium, twenty-two grains bromide of potassium, and one drachm of liquor ammonia to half-an-ounce of water, sixty grains per ounce of solution of carbonate of ammonia, sixty grains of citric acid, and two drachms of acetic acid to one ounce of water, twenty grains per ounce solution of nitrate of silver.

I exposed a plate two seconds to gas, which I knew was the right time, and made the following developer:—

Carbonate-of-ammonia solution	2 drachms.
Pyro. solution	3 drops.
Bromide solution	12 „

Poured it on the plate, and rocked it for a long time without a trace of an image appearing, and, to my surprise, the film keeping bright and the developer not discolouring. I began to think I must have made a mistake and got hold of the wrong plate—an unexposed one; but as I could not see how that could have happened I tried it with a developer mixed this way:—

Water from the tap	2 drachms.
Pyro	3 drops.
Ammonia-and-bromide solution	12 „

The plate came out all right. I thought sixty grains of carbonate of ammonia was considered a strong developer, and I had used less

bromide than usual with a gelatine plate. I could not account for it, but thought I would try one with less bromide.

I exposed another plate three seconds this time, and developed with—

Carbonate-of-ammonia solution ....2 drachms.
Pyro. ....3 drops.
Bromide ....1 drop.

The image began to appear slowly and to gradually gain density, but not enough. Remembering what a powerful dose of pyro. Canon Beechy gave in his formula I added three drops more of pyro., which helped matters both in development of detail and density. When fully out (without having discoloured the developer) I fixed, and took the plate into the light, when I was surprised to see how bright and white it looked by reflected light as compared with the first one and an ordinarily-developed gelatine plate, and what a different colour it had by transmitted light. I was pleased with the result and thought it looked very hopeful.

To try how it would take silver I retreated to the dark room and intensified this way—my usual formula for gelatine plates, and, I believe, the best one, as it is weak in acid and pyro., and does not discolour quickly and so stain the film :—

Water from the tap............................ 2 drachms.
Pyro.. 1 drop.
Citro-acetic-acid solution .... 1 „
Silver solution.................................... 2 drops.

It gained density rapidly and easily, and was very satisfactory.

To try whether I was right in using twice as much pyro. as with the ammonic-hydrate developer, and also whether the bromide really acted so much more powerfully as a restrainer, I exposed three plates for three seconds each. The first I developed with—

Carbonate-of-ammonia solution............. 2 drachms.
Pyro.. 3 drops.
Bromide .... 1 drop.

Second, the same, except using six drops of pyro.

Third:—

Carbonate-of-ammonia solution .... 2 drachms.
Pyro. .... 6 drops.
Bromide solution .... 12 „

With Nos. 1 and 2 I kept the developer on long after the picture was out. On clearing, both were stained slightly in streaks. No. 2 was much more dense than No. 1, and had developed more rapidly. No image at all appeared on No. 3. I got tired waiting, so washed off and developed with ammonic-hydrate developer. As before, the image came out rapidly, but was over-exposed for that formula, having had three seconds when two would have been sufficient.

I then exposed a plate for thirty seconds, applied developer as for No. 2, and as soon as the image appeared added six drops of bromide solution. This kept the high lights perfectly clear (it was a transparency), and the shadows gained density; but I did not succeed in making it equal to the others. I went to bed much pleased.

Next morning the plates still looked well, so I exposed two for negatives, and a little longer than I should have done for ammonic-hydrate developer. The first one came out fully with carbonate-of-ammonia developer, clouds and all, and made the most attractive-looking gelatine negative I have ever seen. It is very bright as a positive—a light drab colour; and a rich reddish-brown by transmitted light. The other plate was deficient in detail in the shadows as developed with the carbonate of ammonia, so I added three drops of the ammonia-and-bromide solution, which brought out the needed detail at once. I washed off quickly, fearing stains on account of the extra amount of pyro. On looking at the backs of these plates before clearing I could see the picture plainly. This is unusual in a gelatine plate developed by liquor ammonia, and accounts for the extra density. Both of these plates intensified easily, and both are excellent negatives.

The advantage of this formula for development is obvious. The ability to keep the developer on the plate for a long time without stains permits a gradual development, and also reduces the silver wholly through the film. There is plenty of time to judge if the exposure have been correct, and, if over-done, bromide acts powerfully to restrain development; but, if under-done, the use of liquor ammonia will bring out detail. I have only tried it with plates prepared by the formula I gave last week. It may not answer so well with others; I shall see. Try it. FRANKLIN.

MY EXPERIENCE WITH THE NEW COLLO-DEVELOPER.

[A communication to the South London Photographic Society.]

I FIND there has been a mistake in the announcement of this paper in the last issue of the photographic journals, which would lead many to suppose that it was a collo-developer of my own invention I was going to bring before your notice, whereas it is the one that was published by Mr. M. Carey Lea, of Philadelphia, in THE BRITISH JOURNAL OF PHOTOGRAPHY for March 3rd last.

I have tried, I think I may say, all the gelatino-developers that have been in vogue for the past ten or twelve years; and to me they all seemed to give negatives of excellent quality, both in the wet and dry processes—in the dry process especially where the addition of nitrate of silver has to be made to the iron developer. With a properly-balanced developer (with gelatine) it gives negatives of great perfection. The negative I now pass round was taken ten years ago by a dry process I was then working. It was developed with a weak iron developer with Beaufoy's acetic acid and gelatine added, and I think you will all agree with me when I say I consider the negative quite perfect.

With the wet process I found this developer was at a great disadvantage; the exposure had to be considerably prolonged, and if the plates were at all under-exposed it gave prints which were very hard and wanting in detail. Another disadvantage was that sometimes, after a negative was washed and dried, on varnishing it would become covered all over with white opaque spots. I think this was owing to some portions of the gelatine clinging to the collodion film. But with all these troubles there was something about the deposit—being so regular and fine—that I could never give up gelatine entirely, and I always use it where I can.

When I read Mr. M. Carey Lea's article I thought it was quite impossible to compound a developer to work by the formula he had put forth. I at once set to work and made the quantity given, working it out to the very letter. A sample of the product I now pass round. I then made up twelve ounces of a fifteen-grain iron solution, to which I added four drops (according to Mr. Lea's instructions, dropped from a glass stirring-rod), added alcohol as usual, and filtered, being very careful not to add more of the restraining agent than was prescribed. Mr. Lea calls particular attention to this. I prepared a plate in the ordinary way, exposed, and, I will not say developed it, but tried to do so, but no image appeared. I kept the developer on the plate two or three minutes, when a lot of dense opaque spots and comets began to appear and expand, and then I could just make out certain portions of the image. I thought this kind of behaviour very peculiar; certainly it was a restrainer with a vengeance—far stronger than any of the known mineral acids. I tried with several samples of collodion; still nothing but spots and comets. I made up fresh developers with different samples of iron; still the same results. I put the developer away for a day to rest; on looking at it the next day I found a very dense powder at the bottom of the bottle. I tried another plate or so, with results a little improved. I gave it another two days' rest after filtering out the deposit, which was of a very brilliant colour on the filter—brighter than ordinary oxide of iron. After letting it rest about three days in all I tried several more plates, and neither comets or spots appeared. The image came out this time. I gave about the exposure I should under ordinary circumstances, but found the exposure was insufficient. There was perfect freedom from fog, showing that too much of the restraining element had been added.

I made another lot of developer, adding this time one drop of the restrainer to five ounces, and let it rest for three days. I once more exposed a plate and gave again an ordinary exposure. On application of the developer the image instantly flashed out, giving signs of over-exposure. I tried several other plates with reduced exposures, and I found then that Mr. Lea had far under-rated the restraining power of this curious compound, and that it gave a developer which would not only permit of shorter exposure, but one that gave results far superior to the ordinary developer restrained with acetic acid, and without the drawbacks I mentioned in the former part of this communication.

There is one thing I noticed in particular—that if the developer be left to stand in a bottle without a cork for weeks it does not change colour; it remains quite as clear as water, and seems to improve by age. The sample I now hand round has been made one month, having been kept in a bottle without a cork. I also submit for your examination two negatives taken as trial plates. The one marked "twenty-five seconds" was developed with an ordinary fifteen-grain iron solution, restrained with fifteen minims of glacial acetic acid—Mawson's ordinary bromo-iodised collodion being used. The lens employed was a rapid rectilinear, by Dallmeyer, eight and a-quarter inches equivalent focus—the smallest stop being used to prolong the exposure. The plate marked "twelve seconds' exposure" was prepared under precisely the same conditions; exposed the twelve seconds, and developed with a portion of the same sample of

developer I have just handed round, the formula standing thus:—

Ferrous sulphate	75 grains.
Collo-restrainer	1 drop.
Water	5 ounces.
Alcohol	*Quant. suff.*

I will leave you to judge of the value of this developer as regards exposure. It also seems to have the properties of formic acid combined with qualities of the gelatine, giving a dense deposit and very fine.

I have a host of experiments in hand which at present seem very promising, and hope at some future time to bring them before this Society.

The only disadvantage with this developer—if it can be called such—is having to make it up two or three days before use. Perhaps the weather, as it gets warmer, may obviate that. The relation of the restrainer, with the formula I have just given, to the best glacial acetic solid at 50°, as regards strength, stands thus:—One pint is equal to seventy-five pints of glacial acetic acid. One pint of glacial acetic acid is sufficient to make 640 ounces of developer, whereas one pint of this collo-restrainer will make 48,000 ounces, equal to 300 gallons of developer, according to the formula I have been using; and I have good reason to believe that it will bear still further dilution on account of the absolute freedom from fog. I have tried it as a restrainer for pyrogallic acid, but I find that it decomposes it.

In conclusion: I will re-state Mr. Lea's formula as published in THE BRITISH JOURNAL OF PHOTOGRAPHY:—

French glue	6 ounces.
Sulphuric acid	6 fluid drachms.
Water	9 ounces.

Mix the acid and water together. First dissolve the glue in this acidulated water; when perfectly dissolved add three more ounces of water, and boil in a flask for two hours; at the end of that time add one ounce of granulated zinc, and boil again for one hour and a-half longer; set aside to cool; then strain. I think all photographers who take up this valuable piece of information that Mr. Lea has so generously given to the world will have every reason to thank him. I consider it one of great importance, and one of the best developers that has been published for many years past. I shall be very pleased to hear if Mr. Lea's experience is the same as mine as regards the developer having to be made about three days previous to using.

WILLIAM BROOKS.

A NOTE TO AMATEUR BEGINNERS.

SOME of the blunders of an amateur beginner may be of use to others who, like myself, wish to take views of places they visit in their short summer tour; and for such, and such alone, I venture to pen the following, which I hope the veteran photographer will not waste his time in reading.

In the first place, I made a grand mistake in thinking that, as I did not know much, cheap apparatus would be good enough for me; but I found the more ignorant I was the greater need there existed for good "tools." Then, again, I tried too large plates, and hampered myself with a useless stock of things.

In this my second summer—for I am but a beginner—I have been out when I could get "leave," which is only for a few hours, with ——'s tourist's pocket camera with tripod and three double backs in a sling case, and rapid dry plates. I have brought several nice little bits home to develope when the day's work was over; and, though I have nothing a "photo. artist" would care for, I have printed some pretty little views which have given much pleasure to my friends, who kindly place them in their scrap albums.

I hope this note of my experience may encourage others to do likewise, and try photography without being discouraged with the many failures we all meet with at the start.

FRITZ.

ITEMS ON CARBON PRINTING, &c.

[A communication to the Glasgow Photographic Association.]

IN attempting to occupy your attention for a very few minutes this evening I have to crave your indulgence, because I have not had sufficient time to do much in the way of preparation. I have tried the best I could to get someone to take up this evening, or to get *matériel* that would be sufficient to occupy your attention during the meeting. Having, however, been foiled in my efforts I have to make this attempt. Let me here say that this may show to members the necessity of each doing something; for, unless we have volunteers you may expect the old lethargy to creep over the Society, and the meetings to fall off. For the rest of this season we are all right. It is your duty to look out subjects to bring before us, and also to look for good and true men to fill the offices of the Association.

As I look back I think there have been three periods when carbon printing has come prominently to the surface, and this almost every four years.

About 1864 all the workers in that material were roused to energy, and Mr. Swan's patent coming into force at this time great things were expected. I will give you pretty long quotations from THE BRITISH JOURNAL OF PHOTOGRAPHY which will show this. At page 91 in the volume for 1864 we read:—

"Carbon printing has long been the supposed panacea for all the evils to which paper photographs are heirs. It has been the ardently-desired goal to which photographic printers have turned their attention; and its attainment has been regarded as of such vast importance that a handsome money prize has been offered by a French duke, through the agency of the French Photographic Society, for the best solution of the problem."

Again: at page 127 it is stated:—

"The solution of the problem of carbon printing has not only been accomplished by Mr. Swan in a perfectly satisfactory manner, but the details of his process are now before our readers in the form of a paper read by him at a meeting of the London Photographic Society. It must not be forgotten that the paper was illustrated by numerous specimens of portraiture and landscapes of great delicacy, the results of the process described, and that the proofs were pronounced by the most competent judges *fully equal, if not superior in appearance, to the best silver prints.* In this judgment we most cordially concur; for certainly for purity of lights, gradation of tone, and brilliancy of effect Mr. Swan's specimens leave nothing to be desired." * * * "With regard to the industrial application we perceive no serious impediment. Nitrate of silver for printing purposes will certainly ere long become obsolete; but while the materials used will be far less costly than heretofore the number of hands employed will be greater."

Mr. Blair writes in 1867, page 377:—

"Mr. Swan has kindly sent me a liberal supply of tissue paper. He has also sent me a number of splendid prints. These prints are really superb, and will compete favourably, I think, with the finest silver prints ever produced; indeed, it appears to me impossible, or at least unnecessary, to produce finer work. Gentlemen of England, if you have a real love for this black art, keep up its character; do not waste time on trifles, blowing pretty bubbles that burst before your very eyes. Give up staining your fingers with silver and your finely-glazed paper with chloride of gold; and if a nugget of soot tumble down the chimney into your glue pot hail it as a treasure trove. Stir it well and filter it better, and then, to use a favourite expression of Mr. Pouncy's, 'dish it up' in a variety of those beautiful and unfading gems—mirrors of nature which ought to adorn the album of every drawing-room and the richly-decorated walls even of the palace."

These expectations were not realised, and the process was not taken up by photographers; but it slowly and surely got into use for copies of works of art. There was at that time a great demand for *cartes de visite*, and almost every photographer had as much as he could do with the process he was acquainted with, viz., silver printing. Although there was a widely-spread doubt that photographs were not permanent, yet the belief was held by many that with careful work and proper washing the picture would last. This belief has now nearly vanished, for I suppose there is not a photographer with any lengthened experience who has not seen his own and other people's photographs fade.

Many attempts have been made to find some other process that would be permanent, and I think these efforts should not be given up. We know the power of chemistry, and surely it is not too much to expect that by applying some chemical the changeable materials of the silver print will be made permanent. There is a sulphur process which points in this direction, and other processes are in prospect. Experiments, I understand, are in progress. It may be as well to keep trying to improve the old process as well as get into the new—carbon.

Carbon, although good, and assuring as to permanency, makes no better pictures than silver; and, having to be printed by guess, or requiring a photometer—which, at the best, is an uncertain guide—you cannot tell until you develope whether the exposure has been right. There are so many manipulations it is quite impossible to get through anything like the same amount of work with carbon printing that you can with silver—that is, with the same assistance and the same outlay of chemicals. I, therefore, say by all means let us study and work carbon, but do not let us neglect to try and get a permanent process after the manner of silver, if not silver itself. We know what an immense advance in photography the use of hyposulphite of soda was—almost its very life. Why should we not expect another step to complete its work?

The next great stir in connection with carbon was about 1870, when Edwards's and, next, Johnson's patents came out, and when the Woodburytype began to be better known and come more into use.

I may here say that I look upon the Woodbury process as about the most likely, as a cheap, handy, permanent process, to come into use for quantities. I had the satisfaction, eight or nine years ago, of seeing through Mr. Woodbury's establishment. The machinery then used was very elaborate and expensive, having an electric machine driven by steam-power to produce the gelatine mould. A powerful hydraulic pump and press were also driven by steam-power. Of course such a process as that could only be gone into by a few men of large capital; but Mr. Woodbury has now patented a method which comes within the reach of all photographers. It seems simple and easy to manage, and with cheap appliances. I suppose we all have what is required, viz., a rolling-press. I think if Mr. Woodbury be as good a business man as he is ingenious he would be sure to make money, get his process known, and add to his honours, by going round to photographers and teaching those who would take out licenses and material; for there is no mistake in saying that the results of his process are good, and nothing can well beat them for cheapness. You can get *cartes de visite* done for forty-five shillings per thousand, or about 6½d. per dozen.

In the year 1875 we had the last great stir in carbon, and it still continues. It has been called the "carbon year." But I think it is 1864 which deserves that designation, when the various works of discovery and improvement were brought into a focus in Mr. Swan's patent.

I do not know much about the different discoveries, but it seems to me it would require a long sifting process and a lawyer-like and correct mind to distribute to each man prominent in carbon honours the position which belongs to him. It may be said that to Mr. Swan is due the honour of concentrating all that was good and useful in, and of building it up with original parts of his own, a process which is practical and has been worked extensively; and I think that even now all the efforts which have been made are but slight simplifications of Mr. Swan's process. As good pictures were made by Mr. Swan years ago as have been shown by anyone up to the present hour. Such is my opinion. I now show you two pictures which Mr. Swan sent me eleven or twelve years ago. They are as good pictures as can be desired; they have been badly kept, having been exposed to damp, but they are quite permanent.

The present movement in carbon has been caused by M. Lambert and his plans and patents. He seems to be an able operator, a clever business man, and has succeeded in getting good men to take his licenses—men who have proved themselves apt scholars, producing as good pictures as the master. These licensees are so numerous, and spread all over the country, that a great impetus has been given to what some like best to call "Lambertypes" or "chromotypes." These are, however, in reality carbon pictures—the tissue only to be had from the Autotype Company, who have also become the proprietors of the Lambert patents.

As to the question of Lambert's originality in his patent, or to the claims of Swan, Edwards, Johnson, &c., &c., I do not intend to inquire into these at present; for, although I have tried to satisfy myself on the point, I acknowledge I have not succeeded. But I will give you my inquiries into another patent.

Some two years ago I bought the utensils and machinery for the manufacture of a trifling article, and for a time I had no idea that anyone had a patent that would interfere with me; but a person soon turned up who gave a warning and insinuated a threat. This made me inquire, and I was surprised to find that Mr. Mawson, of Newcastle, was agent for a patentee, forty years ago, who used the same material and had about identically the same thing. I looked up all the patents I could find, and I do not think there were fewer than twenty, while the difference in each was remarkably little. I will now show you the article, and you can judge whether you think it was worth taking out one patent, much less twenty, for such a thing.

As to the patents on carbon printing I think there has been a great oversight committed, which had better be rectified as quickly as possible. There has been, so far as I have seen, no attempt to patent apparatus and utensils used in the manufacture of tissue or the things used in general carbon printing. Of course M. Lambert's repeating-frame is patented; but I think the squeegee in any of its sizes or shapes has still escaped the patent office. So I want to rectify that a little by submitting the utensil I have been getting up, and you may take this as my six months' notice of patent, which when our session has fairly started after the summer months will have been completed, and I expect you all to become licensees.

The first article which I think would suit very well for coating carbon tissue was Greatrex's invention, and was described at a meeting of the Glasgow Photographic Society many years ago, which description is to be found in the volume of The British Journal of Photography for 1865, page 245. It consists of strips of glass ground closely at the edge so that the solution would flow in an even stream over a large surface of paper.

My next suggestion is that a similar-shaped article be made of tin double, so that warm water may be in the sides and the gelatine solution be kept at a flowing temperature. Or we may use a roller in the trough and dry the coating afterwards with a current of air. We can use a weaver's large feather fan or have a pair of fanners driven by steam-power.

I leave these suggestions before you; take them for what they are worth. Archibald Robertson.

ON THINGS IN GENERAL.

A correspondent, a week or two since, took me to task for my remarks about photochromy, accusing me of a desire to challenge its very existence. It would be interesting to know the mental process by which he evolved such a meaning out of my communications. I am further found guilty of ignorance of the process; Mr. "Nomad's" own letter and The British Journal of Photography last week show me that the old original method of working appears to be getting quietly shelved and something of a different nature substituted. I really am innocent of any practical acquaintance with that sort of work. The beautiful trustfulness that is wounded to the quick when the value of reports is "ignored" is most touching in these unbelieving days; but lest the writer's susceptibilities be too much hurt I hasten to assure him I believe all *his* reports, which tend to show that my restless craving for a nearer personal acquaintance with photochromy is fast approaching satisfaction, for there are now at least two examples of it in the kingdom. I reluctantly confess that, previous to the account of the advent of these two solitary pioneers, I had a sort of faith in the possibilities of the process, but that, alas! is now destroyed by the most damning evidence of their advocate, the description given being—however, suitable for a valentine from cook to "Jeames"—quite unworthy of serious consideration from an art aspect. Save us from our friends! Still trustful, but illogical, "Nomad" thinks there is no doubt there are better examples of the process in existence, and that it would be very suitable for "*facsimiles*" of art collections.

Much light was shed last month on a variety of obscure subjects—notably by Captain Abney with regard to the much-disputed question of photographing the less refrangible rays of the spectrum by means of staining the film. Those who pay any attention to my lucubrations may remember that, a month or two ago, I suggested that it was not owing to the colours of the staining compound, but to some chemical action set up between the dyes and the film. What else could one expect from thalein of dibromofluorescin? It is a wonder there was any film left at all after being treated with such a compound as that. If further proof were wanted of the truth of the saying that "great minds think alike" it is now given. Backed up by the dictum of a great optician, who, I am sure, would not say a word against any theory of Dr. Vogel's if he could help it, Captain Abney comes to the same conclusion as myself; here are his very words:—

"The sensitive salt is nearly pure white, and the nearer it approaches to white the more sensitive to all rays does it become. The addition of a coloured dye to it diminishes the sensitiveness in almost exact proportion to the depth of the colour. * * My belief at present is that the aniline dyes employed by this learned gentleman and Captain Waterhouse combine with the silver and silver bromide left in the films to form compounds of a resinous nature, and that these organic silver salts are sensitive to the red and other rays, as the case may be."

Captain Abney has also been investigating the action of Crookes's radiometer under the various rays of the spectrum. Here, however, he has nothing new to say; he made experiments similar to those described a month or two ago in other places by several observers, and produced just the same result. Although Mr. Crookes has shown the worthlessness of such experiments, he passes a sweeping condemnation upon the value of the radiometer; and, though quite at variance with Mr. Crookes's statement of facts, he, in the face of the latter's long and laborious experiments, allows his own comparatively few trials to justify him in stating that "the hope that has been expressed that the radiometer can help us in photography is founded on false premisses." I only hope that Captain Abney's resin, when he tells us all about it, will prove more useful for its purpose.

The Photographic Society of Great Britain is dealing in surprises and dark hints of late. Hope sprung in everyone's breast a little while ago when it was announced that an entirely new process of

photography was to be expounded by Mr. J. Spiller. I am grieved to say the seriousness of the occasion did not prevent it being turned into laughter when another gentleman announced at the conclusion of the meeting that he, too, had a new process to convey to the Society in due course. The members of the Society, though they may not yet have the pleasure of dubbing one another "Fellows," have yet one thing in common—they can enjoy a joke. The new process consists in making a deadly poisonous gas, and conveying it by means of pipes, like laying a gas main, to the back of every printing-frame; then, after twenty minutes' exposure to sunlight, you get a beautiful picture in pink, mostly composed of sulphur, which could be toned into a dirty drab by means of silver. I wonder what the printers themselves would have to say upon the subject; it would be worse than vivisection. If this is the sort of second-hand mental pap on which the rising photographic genius of the country is to be fed the sooner the Society turn their room into a skating-rink the better it will be for their health and reputation. There is still, however, the new resin and the new process by which to retrieve their character. *Nous verrons!*

The papers read by Mr. Warneke at the same place, though open to criticism, contain much real solid food for thought, and are of a class unfortunately rare there. A few more such investigators, and I have little doubt permanent progress *would* be made in photography. All honour to him; may he give us many such papers!

The question of the permanency of silver prints is again occupying attention, and deservedly so, for the subject is of paramount importance. A very uneasy feeling is getting abroad that the alkaline gold toning is not, after all, such an impeccable process as we have been fondly imagining. As usual, a great deal is being said on each side, and nothing is settled. I propose that the Editors invite photographers generally to look through their collections, and send for exhibition for a few weeks to the office of this Journal examples of prints toned by the alkaline gold process more than ten years ago, giving as full details as possible of any known peculiarity of manipulation. I shrewdly suspect that there would be scarcely one which would come forth from a searching examination with a written certificate of character. I have very grave doubts myself about their permanency, and it would take little to convince me that there are more perfect, unfaded prints in existence out of the few hundreds done twenty years ago by the "sulphur-toning" process than there are out of the hundreds of thousands done ten years ago by alkaline toning!

One fertile source of uncertainty lies in really important alterations of details, introduced without thought of their theoretical importance. A striking case is offered in last week's Journal. I was much pleased to read an account of an apparently excellently-managed system of operations by Mr. W. M. Ayres, who appeals to his long experience to prove the value of his advice; and yet, in looking over some old files of the Journal, I came across the same writer's name, not half-a-dozen years ago, advocating an entirely different method of working, and recommending the addition to his fixing-bath of a quantity of chloride of gold solution. Surely this is the old toning and fixing, and, if Mr. Ayres's prints have stood it, it is to the credit of the old, not the new, process. I should like to hear what some chemical contributors would have to say.

I notice a very interesting article by Mr. Bow on the fading of pigments, which, on the other hand, throws a great deal of light on carbon print possibilities; we know what we should have to expect if such compounds as he described were used in our tissue pigment. By-the-bye, the Autotype Company have never yet replied to my query as to whether they use any cochineal compounds in their tissue, such as crimson lake, carmine, &c.

The photographic readers of the daily papers will have been startled by the account of a gentleman who has been fined nearly a hundred pounds for attempting to take his collodion as luggage by steamer to India. He was warned not to do so, but persisted in the attempt to convey it secretly. It seems to have been badly packed, for by a providential accident it was set on fire before it was sent by the train to Southampton. The effects of such an accident occurring in the hold of a crowded steamer are too fearful to contemplate. As I said, the gentleman in question was fined, and very justly, nearly a hundred pounds. He is sorry now he tried smuggling.

FREE LANCE.

ON THE NEGATIVE BATH.

[A communication to the South London Photographic Society.]

A 12 × 10 glass bath holding about eighty ounces of new solution, thirty-five grains to the ounce, and made with distilled water and three drops of nitric acid, sensitised 213 plates $7\frac{1}{2} \times 7\frac{1}{2}$ inches, being about sixty square feet. It gave up suddenly by needle-like crystals being formed all over the plate, on the inside of the bath, and on the dipper. Before this point was reached the plates developed very weak, and there was difficulty in getting the developer to stay on the plate. The developer was—

Saturated solution of iron	4 ounces.
Glacial acetic acid	4 ,,
Methylated spirit	4 ,,

Eighty-ounce bottle filled up with water.

Now that nitrate of barytes is used in the bath—say ten or twelve drops of saturated solution in a 12 × 10 bath—probably more plates could be excited; but it is usual to discontinue the use of the bath as soon as it is found difficult to keep the developer on the plate. Probably about 170 or 180 plates may be sensitised before this happens. A bath holding eighty ounces of solution, thirty-five grains to the ounce, when discarded as worn out, was found by the argentometer to register sixteen grains; it had also diminished in quantity nearly one-third. The number of plates sensitised in it was about 180 $7\frac{1}{2} \times 7\frac{1}{2}$.

Quantity of silver at first	2800 grains.
Quantity in the bath left	880 ,,
Quantity used	1920 ,,

Practically about ten grains a plate, about 1d. worth of silver, or 3d. per square foot.

With a bath made of new silver and water the plates at first come beautifully bright; but rapidly a surface fog accumulates, which gets worse and worse every plate that is put in the bath. When this occurs the bath has to be taken out, a few drops of a saturated solution of barytes added, and the bath is allowed to stand in the sun for a day or two, when a deposit takes place, and, after filtering, the surface fog never appears again. In the former case, when the surface fog is rubbed off, the film found under is bright like bare glass; whilst in the latter, after the addition of the barytes the film is granular-looking, something like very fine ground glass. The glass plates are all albumenised before coating with collodion, and probably this has something to do with it, In every case the development is pushed to the utmost.

The fog here spoken of would not be noticeable in a negative, nor the granular film; but in the case of transparencies for the lantern, where absolutely bare glass is needed, it is very obvious. Adding more nitric acid to the bath did not diminish the surface fog nor the granularity of the film. Adding iodine to the collodion did tend to clear the film, particularly the granularity, but did not remove it unless an enormous quantity were added, making the collodion quite dark—in which case the exposure was very much lengthened, the resulting image being very weak. The best result was obtained with the collodion a *dark* sherry colour.

R. GILLO.

BENGAL PHOTOGRAPHIC SOCIETY.

REPORT OF THE JUDGES.

WE have the honour to communicate for the information of the Society the awards of prizes made by us for photographs exhibited at your Society's exhibition of 1876:—

Prize A.—Gold medal, by H. E. the Viceroy, to Mr. Marshall Wane, of Douglas, Isle of Man, for portrait of a lady, No. 16.

Prize B.—Gold medal, by the Hon. Lieut.-Governor of Bengal, to Mr. G. L. Kemp, for his series of pictures, selecting Nos. 142, 143, 145, 146, 153, and 157.

Prize C.—Gold medal to Messrs. Bourne and Shepherd for their series of landscapes, selecting Nos. 176, 177, 178, 179a, 179b. and 181a.

Prize D.—Silver medal to Messrs. Bourne and Shepherd for their series of portraits.

Prize E.—Silver medal to Captain Hugh Swiney, 17th B.C., for his series of landscapes.

Prize F.—Bronze medal to Dr. Browne, Muneepore, for his series of views in Muneepore and the Angami Naga Hills.

Prize G.—Silver medal to Messrs. Westfield and Co., Calcutta, for their series of portraits of natives.

Prize H.—Silver medal.—There was no series of photographic pictures of Indian antiquities to which to award this prize. The judges recommend, therefore, that this prize be awarded to Mr. J. Solomon, of Dessau, Anhalt, for his beautiful series of portraits.

Prize I.—Gold medal by the President of the Society to Mr. Marshall Wane for his series of portraits.

Prize J.—Silver medal by the President to Mr. R. Faulkner for his series of portraits of children.

Prize K.—Silver medal by Captain Waterhouse to Mr. J. Brier, of Hollington, for his series of landscapes.

Prize L.—Silver medal by F. H. Bennertz, Esq., to Mr. A. C. Caddy, of Hill Tipperah, for his series of carbon prints.

Prize M.—Silver medal by the Hon. Secretary to the Royal Engineers, Chatham, for their series of landscapes.

No reproductions of works of art were on exhibition.

Calcutta, February 16, 1876.

SUPPLEMENTARY REPORT.

IN accordance with the desire of the committee of your Society, we reassembled this day at the Exhibition room, and, after seeing the pictures recently arrived from Europe, &c., have now the pleasure to submit the following recommendations for consideration and approval:—

We would give an extra silver medal to each of the following exhibitors:—To Herr C. H. Jacobi, of Coblenz, for his series of pictures of reproductions of works of art and his excellent photo-mechanical printing, selecting Nos. 2, 4, 5, 7, 8, 9.

To Messrs. Reichard and Lindner, of Berlin, for their very superior series of portraits, selecting Nos. 1, 2, 3, 6, 7, 8.

To Herr Robert Scholz, of Görlitz, for his series of landscapes, which are specially deserving, selecting Nos. 1, 3, 4, 6, 8, 10.

Mr. Isaac having offered a silver medal for the best composition picture in the room we have no hesitation in awarding the prize to Mr. Smith, for his picture of *Girls at the Spring*.

We desire also to draw attention to the beautiful views in California, which are not, however, for competition.

We have the honour to be, Sir, your most obedient servants,

(Signed) J. E. GASTRELL, *Col.*
T. S. ISAAC.
Calcutta, March 4, 1876. V. PONT.

PHOTOGRAPHY IN COURT.

EXPLOSIVE MATERIALS.

AT the Bow-street Police-court, on Saturday last, the 15th inst., Henry William Johnson, 36, merchant, of 22, Bow-street, was charged, on a warrant granted by Mr. Vaughan, with unlawfully attempting to send away in a British ship, the *Bokhara*, certain dangerous goods, without distinctly marking their nature on the outside of the packages, and without giving written notice of the nature of such goods to the owner of the said ship, contrary to the Merchant Shipping Act of 1873, section 23.

Mr. Poland prosecuted on behalf of the Peninsular and Oriental Steam Navigation Company, and Mr. George Lewis defended.

The former gentleman said the offence alleged against the prisoner was created by the 26th and 27th Vic., cap. 85, sec. 23, which provides that if any person carries, or attempts to carry, on board any vessel naphtha, lucifer matches, or any dangerous materials, without distinctly marking their nature on the outside of the packages, and without giving written notice of their nature to the owner or master of such vessel, he shall be liable, for every such offence, to a penalty of £100. Section 24 of the same Act provides also that if any person carries, or attempts to carry, dangerous substances, under a false description, he will be liable, for every such offence, to a penalty of £500. These proceedings were taken against the prisoner only under the 23rd section. Mr. Poland then said that the prisoner took his passage from Venice to Bombay, and, when doing so, asked if he might take some photographic chemicals with his luggage. He was shown the rules of the company, which utterly forbade the carriage of explosive or dangerous materials on board their ships. He then left, but soon afterwards two packages, marked "H. W. J.," were sent by him to a branch office, at Cockspur-street, as passenger's luggage, and were forwarded to the Nine-elms Station, on the way to Southampton. There an accident happened to one of the packages, and it was discovered that they contained photographic chemicals, such as collodion, ether, &c., all highly inflammable. Ether, for instance, threw out a vapour when exposed to even moderate heat, and the vessel these goods were to be placed in was to pass through the Red Sea. If these boxes had been put on board, in the hold, the result might have been a fearful calamity. The company had taken these proceedings with a regard to the public safety.

Mr. Poland then called Sergeant Pittman, 44 E, and James Smart, 111 E, who gave evidence as to the circumstances attending the defendant's arrest.

Thomas Coyle, clerk of the Peninsular and Oriental Company, at 122, Leadenhall-street, City, deposed that on April 6 the prisoner took a second-class ticket from Venice to Bombay in a steamer that was to leave on April 21. He said he wanted to send a camera and a few bottles of non-explosive photographic chemicals as part of his baggage. Witness said they could not be taken as part of the baggage, and also that they would be explosive if there was collodion or stuff of that kind amongst them. There is a notice in the office to the effect that passengers' baggage can be received at Cockspur-street, the branch office of the company. The prisoner had travelled before.

Henry John Waller, messenger, in the service of the company at Cockspur-street, said it was part of his duty to receive passengers' baggage. On April 10 he received two cases, those now outside. They were marked "H. W. J., passenger, *Bokhara*." They were forwarded to the railway to be sent to join the vessel at Southampton. On the 13th witness went to the Nine-elms Station, and there again saw these two packages. One of them had been partially burnt. He saw six bottles with labels on them—"ether," "collodion," &c.

Cross-examined: The defendant did not deliver the bottles to witness.

James Powell, receiver of goods at the Nine-elms Station, stated that on the morning of the 12th he saw a van of goods belonging to the P. and O. Company on their premises. He proceeded to open it. This was about a quarter to two in the morning, and he was doing it by gaslight. He took off one case and put it on one side to get the second case. He noticed a very bad smell, but as there were several packages about he could not at first tell where the smell came from. In about three or four minutes smoke came from the case he had just put on the platform, and witness had it at once removed. Some explosions occurred inside the case. The foreman came and had both cases removed to the engine-house.

One of the packages was here brought into court.

Mr. Lewis objected to its being close to him.

Mr. Poland observed that it might be brought close to himself, and he would sit on it if Mr. Lewis liked. It was not dangerous now. It was only dangerous in the hold of a vessel.

Dr. Albert James Bernays, Professor of Chemistry at St. Thomas's Hospital, said that he had seen the two cases produced. One was opened. He examined the contents, which were of a very dangerous nature. At a very low heat ether will give off a highly inflammable vapour, which, when mixed with the ordinary air, is extremely explosive. If this had occurred in the hold, as the bottle of ether was broken, the ether would have soon filled the whole compartment with the vapour. The alcohol was absolute alcohol, and was highly inflammable. Collodion is made by dissolving gun-cotton in a mixture of alcohol and ether. There was a large quantity of collodion in the package.

With this witness Mr. Poland concluded his case.

Mr. Lewis addressed Mr. Flowers on behalf of the defence.

The magistrate decided that the charge was clearly proved against the prisoner. Taking into consideration, however, that he had been put to inconvenience and loss of time by being arrested, thus delaying his journey, he (Mr. Flowers) should reduce the penalty (£100) to one of £70 and £10 costs, making in all £80. If the defendant would find two sureties in £50 each, and enter into his own recognizances in £100 to appear next Saturday, or to pay the money in the meanwhile, he might have that time allowed him.

Bail was forthcoming, and it was promised that the money should be paid.—*Daily Telegraph.*

Meetings of Societies.

SOUTH LONDON PHOTOGRAPHIC SOCIETY.

AT the monthly meeting of this Society, held on the 13th inst., the Rev. F. F. Statham, M.A., F.G.S., President, occupied the chair.

Mr. WILLIAM BROOKS read a paper entitled *My Experience with the New Collo-Developer*. [See page 185.]

Two negatives, showing the value of Mr. M. Carey Lea's new collo-developer, were handed round for examination. These may be seen for the next fortnight at the publishing-office of THE BRITISH JOURNAL OF PHOTOGRAPHY.

The CHAIRMAN said that it gave an additional interest to a new discovery, such as that of Mr. Lea, when it was brought before them a second time by one of their own members, with a record of his practical experience with it.

Some conversation ensued upon the various kinds of glue by which the collo-developer might be made, a nearly colourless kind, known as "French glue," having been used by Mr. Brooks.

Mr. F. YORK said that the last developer of Mr. Lea seemed to be quite free from any of the disadvantages of his original collo-developer, which was introduced eleven years ago, and which he (Mr. York) had used a good deal at the time.

Mr. WARNERKE found Mr. Lea's experience and researches very valuable, and the developer last introduced by that gentleman, and now brought before their notice by Mr. Brooks, he had found to be valuable in an especial degree. He used it in the proportion of one drop to three ounces of protosulphate of iron solution, and it acted much better than an addition of acetic acid. He directed attention to two negatives taken simultaneously on one plate of glass in a binocular camera—one of these negatives having been developed by the ordinary iron developer, the other by Mr. Lea's new developer. The latter, he said, would be found to be superior to the former both in intensity and in details. This established the value of Mr. Lea's new collo-developer. A developer made of ammonia-sulphate of iron did not succeed with the addition of the colloidal substance so well as one made of protosulphate of iron.

Mr. BROOKS had not tried the developer with plates prepared in a nitrate of barytes bath, but he believed that anyone doing so would find that by its means a great reduction in the time of exposure might be made. This would be very valuable for those who made a speciality of photographing children.

Mr. F. YORK then read a short communication from Mr. Gillo, of Bridgewater, relative to the negative surface that might be sensitised

by a certain quantity of silver. [See page 188.] He (Mr. York) said that his own experience with barytes was very different to that of Mr. Gillo. He had not used such an infinitesimal dose as he recommended—never less than one grain to the ounce of bath solution, and more frequently five. Mr. A. L. Henderson told him that some of his baths had had over twenty grains to the ounce, and one peculiarity he found was that the baths worked more satisfactorily if filtered through iodide of silver. This seemed to imply that iodide of silver was not the cause of pinholes, or that barytes entirely got rid of the excess of iodide or bromo-iodurct formed by constant use. The one great advantage of the addition of the barytes was that it allowed an old bath to be entirely used up. The fact of boiling to get rid of the spirit concentrated it to the proper strength, whereas the old method of diluting, filtering, and adding new silver still left an old bath. Photographers who adopted the barytes remedy would, he was sure, feel very much indebted to Mr. Henderson for his communication on the subject; it had certainly saved him (Mr. York) much trouble and expense.

Mr. Wilkinson corroborated Mr. Gillo's statistics. In his experience half-a-gallon of bath solution did not remain good after it had sensitised from sixty to eighty square feet. Needle-shaped crystals then began to be formed on the sides of the bath, the dipper, and the plates.

Mr. Warnerke said that such crystals were composed of fulminate of silver, and would be found to be very explosive when subjected to ignition or percussion. He had found the addition of nitrate of barytes to the bath very useful; but on one occasion, when he had none, he had used nitrate of strontium, which acted just as well.

Mr. York was quite prepared to believe the crystals to be fulminate of silver, for on one occasion when he fused them he had quite a series of small explosions.

After some further conversation votes of thanks were given to Mr. Brooks and Mr. Gillo. The proceedings then terminated.

GLASGOW PHOTOGRAPHIC ASSOCIATION.

A meeting of this Association was held in the Religious Institution Rooms, on Wednesday, the 12th inst.,—Mr. Urie occupying the chair. Six new members were added to the roll.

Mr. Carlile laid on the table several copies of plants and flowers, stating they had been photographed in a small town in Italy; and if any of the members had a word to say on how they were produced he would be glad to listen, as, being an amateur, he had not much experience.

Mr. Robertson said they were photographs evidently intended as helps to designers. They were very well executed. There was nothing particular about the method by which they were produced. The flower or plant was fixed on to a white background in such a way as not to show the tyings, and copied with a triplet or long-focussed lens and small diaphragm. The definition in all parts was complete, and the roundness or stereoscopic effect was very good.

Mr. Dodd said he thought the pictures had been produced in the way stated.

Mr. Robertson read a paper entitled *Items on Carbon Printing, &c.* [See page 186.]

Mr. Stevenson said he was sure they were all indebted to Mr. Robertson, who, failing to get any member to read a paper that night, had, in the short time at his disposal, treated them to a rather discursive, yet instructive, paper on patents in general, and on "items on carbon printing" in particular. From the manner Mr. Robertson had seen fit to write on the subject he (Mr. Stevenson) was in a little doubt as to what way remarks should be made upon it. He did not know whether they would be in order in again taking that as an opportunity to say a few hard things about the Autotype Company for the recent so-called stingy manner in which they had seen fit to alter their mode of doing business; or whether, as a worker of Lambert's patent, he should uphold his purchase against those who, not being licensees, seemingly took a pleasure in running it down. Perhaps the latter would be the better way. He must say he assuredly did not think they had been "done." Considering all things he thought they had got the worth of their £30. By working Lambert's modification of carbon printing they had it in their power, as they were all aware, of producing permanent photographs in all styles, ranging from the smallest to the largest size, and these often surpassing the results obtained by silver from the same negatives. Moreover, they had his method of obtaining beautiful enlargements. Transparencies they could also produce, and these were very generally admired for their beauty and gradation. Last, but not least, all were aware that negatives could be multiplied expeditiously, such negatives being in many cases superior to those originally obtained in the camera. Now, all these were boons which only M. Lambert's licensees could estimate; and if the Autotype Company persisted in pursuing their present mode of doing business, and only supply tissue on payment of the required premium, he did not see how anyone could truly say he had not got the worth of his money. But if, as was boasted to him recently, tissue could be got from some houses by all and sundry without their having a license or paying the premium, he would then be inclined to give in, and think they had been led to believe what was not true. If tissue could be got by anyone without paying the premium it might yet lead to an interesting lengthened discussion as to whether, in the interest of carbon printing, they should allow that infringement of supposed rights to pass, or, allowing it, thus secure for silver printing a speedy and natural death.

Mr. Urie said he did not think the colours in the Lambert tissue were permanent, and he did not believe there was a grain of carbon in it.

Mr. Dodd observed that there was not the slightest difference between Mr. Johnston's patent and the way in which Lambert's chromotypes were produced; and it had not been sufficiently noticed that M. Lambert made no claim that carbon printing was part of his patent.

Mr. Gilfillan was pleased with Mr. Robertson's paper. He had been trying to make tissue, and had succeeded pretty well.

Mr. Urie proposed the motion of which he had given notice, viz., "That a small committee be appointed to watch over the expiration of Mr. Swan's patent, and to use what means we can to prevent renewal—the Secretary to communicate with other societies, and request their co-operation." He (Mr. Urie) said:—In calling your attention to Swan's patent, and others connected with our art—and of which there are several hundreds—all more or less of a hampering nature, and throwing impediments in our way, I have been forced to think that, while such obstructions have an injurious effect on our art, by repressing improvement, that, perhaps it would be for the advantage of the profession generally if we could arrange with the holders of patents for the use of our members, which, while securing greater liberty of action, would in the long run, I think, be much cheaper than the present licensing system. I would also suggest that in every case societies should procure the specifications and discuss the merits of every alleged invention before private individuals should be induced to pay for licenses. I would, therefore, respectfully suggest that our Secretary should be instructed to put himself into communication with other photographic societies on this subject, with a view that a committee should be formed from the various societies to watch over, and take action in, this matter; and, as all are concerned, the several societies would, no doubt, see it to be for their interest to prevent extensions of these patents. I may remind you that within two years a number of these patents will have run their course and expired. Among them Pouncy's, Poiteven's, and Swan's patents, in connection with the carbon process of printing. I conceive it should be our duty to prevent by every possible means their extension for any longer period, as a patent running for fourteen years may at the end of that period be prolonged at the option of the Privy Council. I would, therefore, move the resolution I have already read, and that a committee should accordingly be formed from the joint societies to watch over this matter.

Mr. Dodd having seconded the motion, it was unanimously agreed to.

The meeting was then adjourned.

VIENNA PHOTOGRAPHIC SOCIETY.

At the last meeting of the above Society the President urged the desirableness of the Society being well represented at the forthcoming exhibition at Paris, and also of all exhibits being sent in good time. He then read a communication from Dr. Schnauss, in which the latter gave it as his opinion that one might be able to produce very passable carbon prints by following attentively the description of the process given in the technical journals without getting personal instruction from either a Frenchman or an Englishman. A number of photo-micrographs, by Herr Grimm, were then handed round for inspection, after which the President said that it was originally intended to get up the diplomas gained at the late exhibition at Vienna in an artistic manner, but he regretted that that idea would have to be abandoned.

Dr. J. M. Eder read a very interesting paper *On the Double Haloid Salts of Cadmium and their Use in Iodising Collodions*, which was listened to with great attention.

Herr Oscar Kramer then showed the arrangement of Dyck's extinguisher (*"extincteur"*) which was referred to at the last meeting. The principle of the apparatus is that, at the moment of danger, by pressing down a metal knob a bottle filled with sulphuric acid is shattered, and then, by the acid acting upon a solution of bicarbonate of soda, a great volume of carbonic acid is evolved, which, expanding, forces out the fluid.

Some other articles and pictures were handed round for inspection, amongst which were several carbon pictures upon glass by Herr Riewel, painted in transparent colours, and placed behind a sheet of ground glass, which made very tasteful window decorations.

The question box was then opened, and found to contain no fewer than seven questions. To the first of these, which was, "What sort of paper is best suited for carbon tissue paper?" Dr. Székely replied that he thought well-sized post paper would answer the purpose best, though he was quite aware that the foundation of the Autotype Company's carbon tissue was a much poorer and coarser-grained paper.

Herr Luckhardt expressed a wish that, when the questions in the question-box referred to the best means of avoiding some fault in the negative or print, or inquiring as to the cause of such shortcomings, they should be accompanied, whenever practicable, by a specimen faulty negative or print, as when there was only a verbal description there was often considerable misapprehension as to the fault meant.

At the close of the meeting Herr Fuchs displayed a large number of transparencies by means of a sciopticon.

Correspondence.

ON CADMIUM-BROMIDE IN GELATINE EMULSIONS, AND ON DEVELOPMENT.

To the EDITORS.

GENTLEMEN,—I notice that Mr. Berkeley has been giving me a slice of that which he wishes Mr. Lea to administer to himself. He calls it "wigging." As he did not mean to be unkindly, I take it in the same spirit; but I do not deserve it, for I only waited to be certain that my facts were facts before publishing them. I assure Mr. Berkeley that the plates prepared by the formula which I gave were barely dry after development before I was inditing copy preparatory to "rushing into print."

I have a bit of "wigging" for Mr. Berkeley. He scolds me for not exposing the ground I have dug so that he may not be digging the same; and then, after I have shown him the very spot, he persists in trying to unearth the fact that I have already brought to light. I refer to his using cadmium-bromide, hoping to get a rapid emulsion. I stated in my paper that bromide of cadmium gives a slow, dense plate; and this is so, whether used alone or with bromide of ammonium in a much less proportion than his given last week. My statement was not merely a guess, but a fact arrived at by many actual experiments. A plate made according to the formula I gave would have been fully exposed in less than half the time he gave to his plates as described in your last number.

I should be really obliged if Mr. Berkeley would make an emulsion according to my formula, and see if he do not endorse my experience by saying that it is the most rapid he has made; and then let him develope it my way, and see if it be not the best he has made.

Here are more directions for making the emulsion:—Dissolve ten grains of bromide of ammonium in half-an-ounce of distilled water, and soak twenty-two grains of Nelson's opaque gelatine in this for four hours. Dissolve eighteen grains of silver in two drachms of water. Dissolve the gelatine in the bromide-of-ammonium solution by heat, and add the silver solution (warm) in about three doses. Put the bottle containing the emulsion into a jug of hot water, wrap it (the jug) up in a cloth to keep it warm, let it stand for six hours, and then wash for six hours; it will equal one ounce in bulk after washing. All the rest—coating, &c.—to be the same as usual. The same proportions, except nine grains of bromide of ammonium, would require one-fourth longer exposure.

I trust Mr. Berkeley will forgive me if he feel that I have been rather sharp on him, and that he will not think that I intend impertinently to suggest that he should work my formula and give up experimenting. I hope he will not do that. I should like him to try my formula, and then improve it. I believe it to be the most rapid yet published; but it is not so quick as Kennett's "extra rapid," and is, therefore, capable of improvement. Kennett's, however, is a secret process.

I note that Mr. King has used carbonate of ammonia for developing gelatine plates. I am glad to have agreed with him in my paper sent you in the use of an extra addition of pyrogallic acid. I have not noticed the blurring of which he speaks, but I always use a hood to my lens. I also agree with him in the pink stain by exposure to light before fixing. That which he cannot account for I should have thought to be liquor-ammonia stain; but, of course, it could not be, if he always developes with carbonate of ammonia. I wish he would kindly give his formula for his most rapid plates.

I send you a negative made and developed by my formulæ—exposure about one second.—I am, yours, &c., FRANKLIN.

April 15, 1876.

ORGANIFIERS FOR EMULSIONS.—SPECTRUM PHOTOGRAPHY.

To the EDITORS.

GENTLEMEN,—I have read with much interest the remarks, at page 50 of the Journal, on the use of turmeric as an organifier for emulsions. Though I have had no experience with emulsions, the behaviour of some dry plates prepared with a re-sensitiser containing turmeric gave me reason to believe that this substance might be of great value in dry-plate work, as a means of increasing insensity without imparing sensitiveness; but the results obtained were not always accordant, and I could not, at the time, go into the question sufficiently fully to ascertain the conditions under which the best results were to be obtained. I hope, however, to make further trials of this colouring material during the course of the photo-spectroscopic experiments on which I am now engaged.

My object in writing now on this subject is to draw your attention to another yellow vegetable colouring matter—annatto—which also may prove useful as an organifier for emulsions. I have used an alcoholic tincture of this substance prepared from the seeds of the *Bixa orellana* for staining plates prepared with bromised collodion, and have found it give a very much increased range of sensitiveness to the spectrum, accompanied by considerable intensity, as you will see by the photograph enclosed. I have also tried it, with good results, for out-door work with moist plates prepared according to the late Mr. Sutton's method. I have sent you by parcel post a small bottle of the tincture for trial, and shall be glad to hear if you find it of any value.

I have just resumed my work with the spectrum, and have again examined coralline with reference to the remarks made by Mr. M. Carey Lea in a recent number of the Journal. The results now obtained do not fully coincide with those I obtained before, and I must, therefore, work a little further before publishing anything more on the subject. However, I may say that my present results do not agree with those obtained either by Mr. Lea or by Dr. Vogel; but this is, no doubt, due to a difference in the composition of different samples of dye. The sample I have, though red in solution, behaves more as a yellow or orange than as a red, and is highly sensitive only in the blue and violet regions of the spectrum. The dye is not obtainable here, and so I cannot compare the effects of other samples, or would do so.—I am, yours, &c., J. WATERHOUSE.

Surveyor-General's Office, Calcutta, March 24, 1876.

DIALYSIS *VERSUS* WASHING.

To the EDITORS.

GENTLEMEN,—As gelatine emulsion appears to have attracted so much notice in your last issues it seems a fitting time to draw attention to a point which seems to require investigation at the hands of those able and willing to give their attention to the subject, viz., "dialysing" *versus* "washing" emulsions.

If gelatine be soaked in cold water for an hour or so, on shaking the bottle the liquid will froth, thus showing that there is some glutinous substance in gelatine which seems to be distinct from the portion which is insoluble in cold water. It appears desirable, therefore, to ascertain whether this should be retained in the finished emulsion, and whether the working and, above all, *keeping* qualities of the emulsion are in any way affected by its retention. By "dialysing" this substance is retained; by "washing" it is removed. It may possibly be more prone to decomposition than the parts which are insoluble in cold water, and thus tend to destroy the keeping properties of the emulsion.

In my letter published in your issue of the 14th inst. there is an error in the last sentence. It should have been "I *add*," and *not* "I had," no other acid.—I am, yours, &c., F. S. K.

April 18, 1876.

BAINBRIDGE'S DARK TENT.

To the EDITORS.

GENTLEMEN,—In the discussion that followed the exhibition of the above tent, at the last meeting of the Edinburgh Photographic Society, the President thought that in wet weather the tent would get soaked with water on account of not having an outer waterproof cover, and, consequently, become very heavy. I beg, however, to say that such a thing does not happen; for, when the tent is set up the covers are tight, and being inclined at an angle of sixty or sixty-five degrees the rain runs rapidly off, so that, practically, it is waterproof.

As to the objection raised by Mr. Ross, I can only say that many a day have I worked in the full blaze of the sun, when no shady place was near, and no discomfort was felt; but I was rather glad I had the tent to fly to as a place of shelter from the sun's rays. At the same time allow me to say that a fully-ventilated tent can be had by anyone requiring the same without any additional cost; nevertheless, I can fully substantiate the reply of Dr. Nicol to Mr. Ross—that in practice no ventilator is required.—I am, yours, &c., J. T. BAINBRIDGE.

April 17, 1876.

THE ZIG-ZAG WINDOW.

To the EDITORS.

GENTLEMEN,—Anyone who travels to Manchester and passes Knot Mill Station cannot fail to notice, while looking over the tops of the houses, one of glass, constructed on the zig-zag principle. This is Mr. Rogerson's studio, built twelve years ago, and used to the present day for photographic purposes; another is Mr. Biddle's studio, Great Bridgewater-street; and another is in Stretford-road—all three being built many years ago with a zig-zag top. Mr. James Mudd, St. Ann's-square, has also used for ten years a zig-zag side light.

It would be interesting and useful to know what benefit these photographers have really derived from this mode of construction before altering our galleries.—I am, yours, &c., PHIL. C. STORTZ.

101, *Alexandra-road, Moss Side, Manchester, April* 18, 1876.

DEATH OF MR. W. CLEARY.—On the afternoon of Saturday last, the 15th inst., shortly before one o'clock, Mr. William Cleary, photographer, Bradshawgate and Deansgate, Bolton—whose name will be well known to our readers in connection with the reciprocatory burnisher—was found dead on a sofa at his residence, 31, Bury-street, Little Bolton. It appears that on Friday the deceased was in Manchester, with Mr. Frank Walton, photographer, of Leeds, but at present at

Manchester, and was engaged in taking photographs at Knot Mill fair. He was so occupied until seven o'clock in the evening, when he left for Bolton by the train. The next that was known of him is that Mr. James Dooley, of Bolton, accompanied by a friend, was on the platform of Trinity Station, Bolton, and saw the deceased get out of the Manchester train. The latter having stumbled they hailed the cab of Philip Toole, and the deceased, who then appeared in a helpless condition and was foaming at the mouth, was placed in it, the cabman having directions to take him to his residence in Bury-street. The cabman accordingly took him to his house, and there left him. Mrs. Cleary at once attended to him, and he lay down on the sofa, where he remained the whole of the night. He seemed to recover after a time, but it does not appear that he made any complaint to any of his family. Mrs. Cleary rose about half-past six o'clock in the morning, and at that time he was still on the sofa. They had some conversation about domestic affairs, and she left him to attend to the shop. At one o'clock she returned, and then found him lying dead where she had left him. An inquest was held on Wednesday last, the 19th instant, before Mr. Rowland Taylor, Deputy Coroner. Mrs. Cleary, Mr. Walton, Mr. Dooley, and the cabman gave evidence to the above effect. Dr. Settle said he had made a post-mortem examination. He examined the body externally and found an abrasion on the nose, forehead, and left cheek, all slight and recent. Internally he found no injuries corresponding with the external marks. On opening the skull he found an extensive effusion of blood. There was distinct evidence of disease of the blood-vessels. His opinion, from the appearances, was that death had occurred from natural causes, and not from the injuries. The body was comparatively healthy. Death had resulted from apoplexy. A verdict of "Death from natural causes" was returned.

EXCHANGE COLUMN.

ANSWERS TO CORRESPONDENTS.

☞ *Correspondents should never write on both sides of the paper.*

J. D. Lysaght.—Thanks.

Crackspilt.—How was the varnish prepared?

A. B. C.—Your glass house will not be affected by the patent, more especially as it was erected before the date of the patent.

R. D.—We have not yet had time to test the sample of pyrogallic acid. We shall consider as to the propriety of writing such an article as you suggest.

Leith Photo.—Watch the development of the plate very attentively, and the instant that any indication of discolouration is perceived apply a solution of tartaric and citric acid.

Memo. Neciba.—We cannot assign a cause for the marking across the paper. If the same kind of line has occurred in other sheets a note of complaint ought to be addressed to the maker of the paper.

G. B. G. T.—The yellow stains and spots are owing to the weakness of the fixing bath. By considerably increasing its strength, and allowing the prints to remain in it for eight or ten minutes, you will cease to be troubled with such spots.

A. F. M.—Instead of constructing your small camera with a bellows body, it will be found much more convenient and scarcely, if at all, less portable if made of wood, the focussing being effected by means of a sliding or screw mount to the lens.

An Operator.—It is probable that it may be obtained from Mr. J. Solomon, Red Lion-square. Should you experience any difficulty in obtaining it you must manufacture it for yourself, which can very easily be done by the aid of a Florence oil flask.

Alpha.—The *cartes* are pretty good, but they are not by any means up to the standard of those which would be sent out by a photographer jealous of his reputation. The faces are all too "patchy," and the sharpness is not what it should be. Expose longer, and focus more carefully.

R. J. Jones.—The markings on the negative are caused, in some way or other, by the slide. Of this we are as certain as if we had subjected the dark slide to a minute examination. Bold, well-defined marks on negatives, all of them being of a similar form and on a similar part of each negative, cannot be caused by the bath.

H. C. R.—For obtaining instantaneous stereoscopic views the best kind of lenses to employ are quarter-plate portrait combinations. If it be found necessary to employ a stop, let it be placed rather near to the front lens, as this will—at anyrate with certain lenses—both flatten the field and give a more brilliant image than if the diaphragm were situated midway between the lenses.

Justice of the Peace.—You were correct in assuming that your not furnishing your name was the cause of our not replying to your query. To rectify the bath solution add sufficient of a solution of bicarbonate of soda to make it slightly opaline, then heat to the boiling point and place it in the sun for two days. Now filter, and acidulate very slightly by adding a few drops of greatly-diluted nitric acid.

A Country Photo.—It is probable that in our next number we shall have something to say concerning the coating and drying of gelatine plates. From some experiments we made for a totally different purpose we believe that we shall be able to indicate a method by which plates can be coated and dried in a rapid and satisfactory manner, quite irrespective of high temperature. When writing this our further trials remain incomplete.

B. Müller.—1. Your query is one for an ophthalmic surgeon. You had better consult Mr. W. Ackland (Messrs. Horne and Thornthwaite's), who has made that particular kind of disease a special subject of study.—2. Schlippe's salt could not possibly produce the effect desired on the negative when used in the manner in which you have employed it. It is essential that the plate be first "chlorised."

S. S. X.—A simple method by which you will be able to ascertain the value of an addition of sugar to the developer is to make up a quantity of developer, divide it into two portions—to one of them adding a little sugar, and using the other portion without such addition. Then develope plates with each and note the difference. This method is very simple, you must admit; it is singular that it did not occur to you.

Chemicus.—If the diaphragm of the lens be inclined downwards it will cause a much larger pencil of light to be transmitted to the plate from the foreground than from the middle and extreme distance, while a very large amount of light will be cut off from the sky. By the adoption of this expedient a more evenly-lighted picture will be obtained than if the diaphragm were placed, as it almost invariably is, at a right angle to the axis of the lens.

Rev. T. Scott.—Our correspondent inquires if it be really the case that gelatine dry plates may be obtained of a degree of sensitiveness *quite* equalling that of wet collodion. We say, in reply, that it is undoubtedly true that dry gelatine plates are sensitive to the degree above stated; but it is further true that the devotees of this new medium claim for plates prepared by its aid a *greater* amount of sensitiveness than is obtained with wet collodion.

L. Wood.—1. Gutta-percha tubing will not, it is said, have any bad effect upon distilled water.—2. The specks in the glaze of the porcelain vessel will not injure the printing bath.—3. The application of the glycerine solution will make the plates a little slower than they would otherwise have been. Glycerine plates produce excellent negatives when properly manipulated.—4. The dish has nothing to do with the spots in the picture.—5. Methylated solvents will answer exceedingly well.—6. A better print than that which was enclosed may be obtained from the negative.

G. G. A.—In order to supply you with the historical information required we should have to transcribe about three pages of Hunt's *Treatise on Photography;* we therefore refer you to that volume. If you cannot conveniently gain access to it you may, by calling at the Publishing Office of this Journal by appointment, have an ample opportunity afforded you for inspecting not only that work, but others containing much historical information, and which may prove useful to you in compiling your lecture. But we tender you the following advice:—In lecturing upon photography before a mixed audience such as that which assembles in a Mechanics' Institution, avoid the introduction of much historical matter, and "go in" largely, instead, for experiments of an optical, chemical, and manipulatory character.

Received.—G. W. Webster, F.C.S.; E. Dunmore; "Mark Oute." In our next.

New Catalogue.—Mr. Muybridge, of San Francisco, has sent us the new supplement to his catalogue of views illustrating the Pacific Coast of Central America and Mexico. It is suggestive of views possessing great interest.

The Medals at the Bengal Photographic Exhibition.—It is gratifying to be able to record the fact of the highest award—"Prize A., gold medal offered by H. E. the Viceroy"—having been worthily secured by a well-known photographer, Mr. Marshall Wane, of Douglas, Isle of Man. This artist has also been so fortunate as to have been adjudged a *second* gold medal—that offered by the President of the Society. The former was awarded for a portrait of a lady; the latter for a series of portraits. The President's silver medal has been secured by Mr. Robert Faulkner, of Bayswater, for a series of portraits of children. The Honorary Secretary's silver medal has been awarded to the Royal Engineers, Chatham. The competition appears to have been a spirited one; and we are certain that the prize awards—the details of which will be found in another page—will be examined with much attention.

METEOROLOGICAL REPORT,

For the Week ending April 19, 1876.

Observations taken at 406, Strand, by J. H. Steward, Optician.

These Observations are Taken at 8.30 A.M.

April.	Bar.	Wind.	Wet B	Dry Bulb.	Max. Tem.	Min. Tem.	Remarks
13	29·58	W	33	36	41	33	Dull
14	29·59	E	36	36	48	32	Dull
15	30·28	E	42	46	56	36	Fine
17	29·69	SW	44	45	56	38	Dull
18	29·26	S	46	49	57	38	Dull
19	28·93	S	46	48	—	44	Cloudy

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THE BRITISH
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No. 834. Vol. XXIII.—APRIL 28, 1876.

IRON DEVELOPMENT FOR DRY PLATES.

During the last few weeks general interest has been evinced on the subject of development in its different forms, and we think that at least in connection with dry plates the scope of some developers may be considerably extended. With wet plates it has come to be accepted that the best form of developer for general purposes consists of the plain fifteen-grain solution of ferrous sulphate acidified with acetic acid, though reports from various sources of the behaviour of Mr. M. Carey Lea's latest addition to our list promise for it a large share of favour. Turning to dry plates, the two modes in most general use at the present day depend upon the use of pyrogallic acid, either in combination with an alkali or with silver nitrate and a restraining acid; salts of iron, in spite of their universal employment in connection with wet plates, have apparently never been successfully applied to the development of dry plates.

This is, perhaps, to be regretted, as we know that many photographers are deterred from practising the latter branch of their art merely because they fancy it will be necessary to learn an entirely new mode of manipulation and development. This may be to a slight extent true, but would scarcely form a serious obstacle in the way of an intelligent man; though it is beyond question that the successful adoption of iron development for dry plates would give a great impetus to the practice of dry-plate photography.

It was with this idea in view that we, last year, went through a course of experiments in the direction indicated, a portion of our results having been published at the time, though they related chiefly to the use of wet or moist emulsion plates—a sort of stepping-stone between the ordinary wet and dry plates. We shall now take up the subject where we left it on the previous occasion, dealing with the development of dry plates without the use of pyrogallic acid. First, however, we must consider the action of the iron salt and of the various substances used in combination with it.

Except under certain conditions of the bath—and even then the results are practically of little use—it is well known that in the ordinary wet process it is not possible to employ the salt of iron alone, owing to its reducing action upon the free silver retained in and on the film, which would result in instant fog. It is necessary, therefore, to employ a "restraining" substance to hold in check this reducing action in the solution itself, while it permits the deposition of the reduced metal upon those portions of the film which have acquired a special power of attraction or reduction by exposure to light. These restrainers consist chiefly of acids, the vegetable acids proving the most generally useful, while gelatine, sugar, molasses, and a few other substances have also been employed with success.

The action of the developer depends very considerably upon the nature of the restraining agent employed, as the retarding force appears to be exercised not only upon the natural reducing power of the iron solution, but also upon the development and, perhaps, also the time of exposure. Thus it is that acetic, formic, and citric acids produce such different results, the last named exercising a very powerful effect upon the rapidity, both of exposure and development, as compared with its action in checking reduction, while formic acid stands foremost in retarding reduction without militating greatly against rapidity or development. Sugar and molasses, though so nearly alike in composition, behave very differently in the developer; the latter acts as a powerful restrainer in every way, and has also been employed to entirely arrest development by pouring it on to the plate without previously washing off the developer. Sugar, on the contrary, has been substituted for a portion of the acid usually employed, and forms a developer which permits of very short exposures without in any way interfering with the quality of the result, being apparently a retarder of reduction, but not of development.

Gelatine, again, is possessed of properties to some degree different from either acids or saccharine matter. Its well-known effect in retarding all forms of chemical action renders it peculiarly valuable in the developer; for while it arrests the reduction of the soluble silver salt in a very distinct manner it produces little corresponding effect upon the exposure. A very small proportion is found to be sufficient to prevent fog, while the latent force existing in the exposed portions of the film remains intact, and thus the employment of gelatine conduces to greater rapidity; but its great recommendation lies in the fact that the deposit formed upon the film is formed so gradually and in so fine a state of division as to be remarkable not only for its delicacy in the half-tones, but also for its density and non-actinic power in the lights.

At first sight it may appear difficult to comprehend why the conditions which ensure success in the development of a wet plate should be altered in the case of a plate similarly prepared but dried before exposure. A few words of explanation will be sufficient to make clear at least one cause of the discrepancy. Our readers will scarcely need to be reminded that it is of the utmost importance that the whole of the free silver be removed from the plate before drying, and that the presence of free nitrate is necessary to the successful development of the image. It therefore becomes necessary either to flood the plate previous to development with a weak solution of silver nitrate or to add a small quantity to the developing solution; but even then the conditions are altered—slightly, it must be confessed, but sufficiently to cause great difference in the action of the developer.

It will be understood that a wet-plate film upon removal from the slide after exposure is in the best possible state to undergo development, the pores of the collodion being open and permeable to the solution; thus the development proceeds rapidly and is completed before the solution becomes cloudy from the total reduction of the silver nitrate, permitting, therefore, the use of a less powerful restraining acid than would otherwise be necessary. In the case of a dried film, however, the pores of the collodion having been once closed or contracted by the drying it cannot be made to resume its original state; and this, combined with the fact that the free silver is confined to the surface, renders the bringing out of the image slow and tedious, so that in order to keep the developing solution clear until the image is out, and to prevent fog, it is necessary to use a larger proportion of restraining acid, or one which acts more powerfully against the reduction of the silver. This in turn necessitates an increase of exposure, and has caused iron to be almost abandoned for dry-plate purposes.

Some descriptions of dry plates, however, may be very successfully developed in this manner—notably those of Dr. Hill Norris—owing

mainly to the nature of the preservative employed; but in nearly every case it has been found that the advantage as regards exposure is in favour of alkaline pyro., especially when a fair proportion of bromide is used in the collodion.

That the difference in the action of the iron salt upon dried films is due entirely to the altered physical properties of the collodion is abundantly proved by preparing two plates with the same materials, and in identically the same manner, except that one is dried while the other is exposed directly the free silver has been removed. If the development also be conducted in the same manner it will be found that the image upon the undried plate will make its appearance almost as rapidly as if the exposure had been made without washing off the free silver; while, on the other hand, the dried plate will be some time before it shows any trace of even the highest lights, and when the picture does appear it will be thin and weak, as if confined to the surface of the film.

Emulsion plates, as we stated last year, may be exposed while still wet, and developed by means of iron, without materially increasing the exposure, and the result will be in every respect equal to those developed with alkaline pyro.; but in pursuing our experiments in the direction of dry plates we were not for some time successful in securing a satisfactory result. We found that by exercising certain precautions it was quite possible to produce most perfect images—images which, in some respects, possessed advantages over those obtained by the alkaline method; but the exposure was, unfortunately, much increased in consequence of the necessity of using citric acid as the restraining agent.

We attempted various modifications, and varied the experiments by using different salts of iron—such as the double sulphate of iron and ammonia, the acetate and the nitrate. We also tried several different acids—such as formic, tartaric, carbolic, and some of the mineral acids, as well as sugar, molasses, methylal, glycocine, and gelatine itself; but the result was nearly the same in every case, none, with the exception of the gelatine preparation, giving clean and satisfactory results without the addition of a variable proportion of citric acid. The latter, when used in the form of sulpho-gelatine (the product of the action of sulphuric acid upon gelatine), gave clear, strong images, but with too great contrasts and a lack of detail in the badly-lighted portions. This was probably due to the presence of free sulphuric acid. Glycocine, prepared and crystallised, required the addition of acetic acid in order to keep the developer clear, but not in so large a proportion as when the acid alone was used; the image obtained, however, was thin and unsatisfactory.

We had almost come to the conclusion that iron was practically useless as a developer for dry plates when Mr. M. Carey Lea published his recent formula for the new collo-developer. This appeared to offer advantages not possessed by any of the preparations hitherto used; and we took an early opportunity of putting it to the test, obtaining, we are glad to say, most encouraging results. Though not quite so rapid as the alkaline developer, the difference is so slight that it may well be ignored by those who prefer to use silver development, as it far excels acid pyro., the only one hitherto available. The formula we employed consists of a fifteen-grain solution of protosulphate of iron, to every three ounces of which we added one drop of the preparation described by Mr. Lea; the action seemed to improve after the developer had been mixed a few days.

We are glad to be able to add our testimony to that of Mr. Brooks in favour of this new mixture, feeling certain that it will work its way into very general use. Those of our readers—and we believe there are very many—who object to the alkaline method of development will find the one we have suggested a very useful and satisfactory alternation, and if it should induce any of them to adopt dry-plate work our object will have been gained.

OUT AND ABOUT WITH THE CAMERA.

There is scarcely a better way of arriving at a correct knowledge of the present state of the photographic art in its application to landscapes than to attend the "outings" of an advanced body of landscape photographers such as the London "Amateur Field Club"—associated with which are many names familiar to the photographic public "as household words," both as regards research and the production of works of the highest artistic merit. On Saturday last, the 22nd inst., taking advantage of the exceptionally fine weather with which metropolitan pleasure-seekers were favoured, we joined a very large party of our brethren of the Field Club in the first outdoor meeting of the season.

Since we last devoted an article to the Field Club a change for the better has been effected. *Then* it seemed to be a matter of indifference to some of the members whether or not they took their cameras; hence was too frequently seen the anomaly of professedly practical landscape photographers abstaining from practising their art under the only circumstances which in their incorporated capacity were left open to the members. But since those days the *personnel* as well as the rules of the Club have undergone change, and *now*, if we are permitted to judge by the recent meeting, there is not a member who does not go out fully equipped to the "field of action."

It is a significant fact, as indicating the signs of the times, that among the large number of photographers present at the meeting the wet process was quite unrepresented, not a solitary tent or even developing-box being visible. This is the more significant inasmuch as in the list of members of this Club are to be found nearly all the amateurs by whom have been designed the most recent improvements in such appliances as facilitate the production of wet collodion negatives in the field; certainly the best "pocket" tent, and one of the best, if not the very best, developing-boxes at present in existence are associated with names to be found on the roll of members of the Amateur Field Club.

Cameras and apparatus of the best and most-recently devised forms are to be found among the *impedimenta* of the members of "Our Club;" and it was noticeable that on Saturday there was a large number who seemed to have laid the time-honoured and very convenient double dark slide on the shelf, in favour of the still more time-honoured changing-box and slide. This is probably due to the fact that, in virtue of certain improvements to which it has recently been subjected, the changing-box has had eliminated from it the residuum of previously-existing inherent disadvantages. And we here embrace the opportunity of answering a question which has been frequently put to us, namely, "Which is the more convenient—the changing-box or the double dark slide?" In reply we say that for accommodating six or a smaller number of plates the dark slides are the better; but for any number over six we unhesitatingly give the preference to the changing-box of modern construction. He will be considered a thorough reformer who invents a double dark slide—to be constructed either in metal, wood, or ebonite—much thinner than those at present in use. On carefully measuring the thickness of a double dark slide in our possession, made by one of the recognised first makers of photographic apparatus, we find that it is exactly equal to twelve glass plates of the usual thickness for negatives. The workmanship is doubtless very excellent and substantial, but it might certainly be possible to curtail the dimensions of a slide capable of holding two $7\frac{1}{2} \times 5$ plates to something less than $9 \times 6\frac{1}{2}$ inches in size, and seven-eighths of an inch in thickness, and yet leave ample accommodation for two glass plates. Until this be done the full development of the double dark slide will not have been reached, and a changing-box will be preferred for any number of sensitive plates exceeding half-a-dozen.

It was also an observable incident that several of the members had gelatino-bromide plates. We are unable to give a list of the various dry processes in use, but it would not be too much to assert that by far the larger number of plates exposed were prepared by an emulsion process, and, as we have said, gelatine emulsion was well represented. We exposed several of these plates, and on each occasion gave an exposure precisely similar to what we should have given with wet collodion. This we find to be an excellent degree of sensitiveness; and we think that Mr. Kennett has done well to manufacture a pellicle from which plates of such sensitiveness may be prepared. A more sensitive pellicle than this may be, and undoubtedly is, very useful for a variety of purposes; but for

general landscape work the wet collodion standard seems quite sufficient. With a gelatine dry plate and a rapid landscape lens we obtained an instantaneous view of a swan gliding on the surface of one of the lakes on Keston Common, on the occasion of the excursion of Saturday.

Mentioning the name of Mr. Kennett suggests an allusion to the camera-stand introduced by that gentleman at a meeting of the South London Photographic Society, and of which we recently gave a detailed description in these pages. Stands constructed on this principle and according to the published directions were well represented at this meeting. These stands are exceedingly convenient, and their cost does not exceed that of one of the ordinary tripods; there is no restriction upon their manufacture, which is within the power and scope of any skilled artisan.

DANGER IN THE DARK ROOM.

Considering the nature of much of the *matériel* with which photographers work, and the too often confined and cramped space in which that work is carried on, the fact that few accidents to life or property occur forms a strong argument in favour of the care and judgment exercised by the members of the profession generally. But while admitting this much we are not inclined to undervalue the words of warning which are from time to time uttered, especially when they refer to substances not generally regarded as of a highly-poisonous nature; while, at the same time, we deprecate anything like unnecessarily raising doubts in the minds of the more timid of our friends as to the safety of *matériel* hitherto considered harmless. An example of each of those methods of dealing with questions relating to photography has recently been rather prominently brought forward, to which we think a little consideration may not unprofitably be given.

Reversing the order in which we have placed them, we first notice a paper by Mr. R. Gillo, read before a meeting of the South London Photographic Society, and more especially certain observations which were made in the course of the discussion thereon. We may say, in passing, that we were somewhat startled with the conclusions at which the author of the paper arrived, and amused at the means which he adopted to bring them out. We are told that 180 $7\frac{1}{2} \times 7\frac{1}{2}$ plates were sensitised in eighty ounces of a thirty-five-grain bath, and that it was thereby reduced in bulk to about two-thirds, equal to considerably over a drachm of solution taken up by each plate—a state of matters indicating, we think, a sad want of draining. Then the remaining two-thirds of the bath were tested *by the argentometer*, and found to contain only sixteen grains per ounce. On the supposition that this result was correct it would imply that the amount of silver converted into iodide and bromide was about 988 grains. From a large number of experiments with an average thick collodion we find that three ounces are required for the coating of eight feet of glass; and as 180 $7\frac{1}{2} \times 7\frac{1}{2}$ plates contain seventy feet—although Mr. Gillo makes 213 only about sixty feet—the quantity of collodion used would be about twenty-six and a-half ounces. Taking an average of six grains of haloid salts per ounce, with a capability of combining with four grains of nitrate of silver, it will be evident that 106 grains is much nearer the mark than 988.

One source of error into which the author of the paper has fallen is in the use of the argentometer—that is on the presumption that by that designation we are to understand the instruments which indicate the specific gravity of the solution; although we had supposed there was hardly a photographer in the country who did not know that in consequence of the quantities of ether and alcohol taken up by the bath, and the substitution of other bases for the silver, such instruments give no idea whatever of the quantity of nitrate of silver which may be in the solution under examination.

But what we wish specially to call attention to is the statement that after a certain, or uncertain, number of plates have been sensitised in a bath there begins to be formed a quantity of crystals that are deposited on the dipper and on the sides of the vessel, and that these crystals were said by Mr. Warnerke to be fulminate of silver. We know Mr. Warnerke to be an excellent experimentalist and careful observer, and are aware that under certain circumstances, when nitric acid and alcohol are brought together, the latter, by oxidation, is changed into aldehyde and oxalic acid, and the former to nitrous acid, which, in its turn, acts on other portions of alcohol so as to form nitrous ether, fulminic acid, and water. It is possible that the fulminic acid, $H_2\,C_2\,N_2\,O_2$ may, immediately on its formation, have its hydrogen replaced by two atoms of silver, becoming fulminate of silver—$Ag_2\,C_2\,N_2\,O_2$; but, although we have frequently examined the crystals occasionally found in baths which have been long in use, we have never seen anything to lead us to the conclusion that they were in any degree related to fulminating silver. We have frequently, in fusing the residue of a bath, noticed the slight explosions mentioned by Mr. F. York, but are disposed to look upon them as due to deflagration of the nitrate in conjunction with the organic matter. Be that as it may, we can, from long experience in such matters, assure our readers that they may go on boiling down their baths and fusing the residues with perfect safety.

The other point, or useful word of warning, to which we desire to call the attention of our readers occurs in one of a series of lectures on *Unhealthy Trades* now being delivered by Dr. B. W. Richardson, F.R.S., in which much that is interesting to photographers is said on both bichromate of potassium and cyanide of potassium. Of the dangerous nature of the cyanide salt photographers have been well aware; but we are not so certain that they were fully alive to the consequences of the absorption of the bichromate. Now that it is being so largely used, and likely to be still more so, in carbon printing we think it right to again call attention to the subject.

Dr Richardson tells us, on the authority of Bécourt and Chevaller—who have given the subject much attention—that if the skin of the body be entire it may be exposed to a strong, and even heated, solution of the bichromate without any bad effects; but if the skin be torn or abraded or cut, and the salt be left in contact with the wound, the caustic action is so intense that severe inflammation follows, with decomposition of the living tissue and the formation of ulcers, which go on deepening till they reach the bone. The wounds thus made are exceedingly difficult to heal, and frequently spread to such an extent as to convey the idea that a veritable metamorphosis of the skin and flesh had taken place, somewhat analogous to a fermentative action. We need hardly urge, then, how necessary it is that those whose business leads to their hands being brought into contact with bichromate solutions should see that the skin is entire; but we may add that it is almost equally necessary to put the hand as little as possible into such solutions. Even when quite free from abrasions or wounds of any kind they are frequently affected by a peculiar irritation and violent itching, and if then the skin be abraded by rubbing, ulceration of the worst kind at once sets in.

Photographers are, we think, much indebted to Dr. Richardson for directing attention to the subject, and can assure them that it is no fancy picture. We are aware of a case where one of our friends, who for some months had been experimenting with the making and sensitising of carbon tissue, suddenly found the skin of his hands extremely irritable, and itched to such an extent that nothing but violent scratching gave even momentary relief. This soon abraded the skin, and the result was that both hands were almost completely ulcerated, and for nearly a year defied the best medical skill that could be obtained. They have now been quite healed for nearly three years; but he is under the impression that the disease was more than local, as he has not even now fully regained his wonted general good health.

We may add that bichromate of potassium, if taken internally in doses of fifteen grains and upwards, is said to cause death, and strongly advise all who require to use it to exercise all due care both in its storage and use.

Glycerine has long been employed in various branches of photography, and, from its peculiarly hygroscopic and non-volatile nature, it has proved itself to be eminently useful. It is known in chemistry as a powerful and valuable solvent; and, from the fact that it appears to exert no chemical influence on most salts and reagents, it has been customary to look upon it as a neutral or inert substance.

Recent researches, however, would lead to the view that this is incorrect. It has long been known to exert a powerful mechanical influence upon animal tissues, increasing the penetrative action of substances applied outwardly, while the internal action of many medicines with which it has been combined have been found to be considerably modified. Now, however, it is asserted that it possesses distinct chemical properties (or, perhaps more correctly, *chemico-mechanical*, if we may use the term), similar in character to those of gelatine, in modifying and retarding chemical action. It is said to retard considerably the precipitation of various salts, and in some cases to arrest such action altogether; tannin dissolved in this menstruum is said to cause a precipitate with such substances as gelatine, albumen, &c., unless diluted to some extent with water, but to what extent such dilution may be carried without destroying the effect is not stated. Many cases will readily suggest themselves in which the property may be utilised in photography; as, for instance, the introduction of albumen into gelatine emulsion, which has hitherto presented difficulties owing to the coagulating effect of the silver nitrate. It may also be found useful in preparing the preservative recommended by Mr. M. Carey Lea, in which tannin and albumen play important parts, and which has been found so difficult to compound in this country. It has been asserted by some that the effect of glycerine when added to a washed emulsion is to cause insensitiveness. If the theory propounded above be correct, we may assume this result to be produced by the retarding action of the glycerine upon the combination of the silver with the soluble haloid and the consequent presence of free bromide. The matter appears to us to be worth ventilating, so we lay these remarks before our readers in the hope they may be found useful.

PHOTOGRAPHIC NOTES.

I.—Dry Plates Made with a Negative Bath.

In looking over one of my note-books I find a record of some experiments, made in the autumn of 1871, which I do not think I have ever published, and which will be of interest to those who cannot reconcile themselves to the emulsion processes and continue to use the negative bath. The result of these experiments went to show that the same principle which I had then tried with favourable results in emulsion plates could be used in bath plates, viz., *that the washing of the plate before applying the preservative could be dispensed with.*

Plates were made in the ordinary negative bath, were plunged directly into various preservatives, and then dried and exposed. They gave excellent results, and seemed, perhaps, even superior to those made in the ordinary way. It appeared, however, that it was desirable not to use a preservative bath for too many plates, as when the bath contained too much silver the plates had a tendency to fog. Probably a good way would be to use two preservative baths, so that the second should wash off the first, very much in the same way that two negative baths are sometimes used; or, after taking the plate from the preservative bath, a little fresh preservative might be flowed over it, to remove the first. In this way difficulties depending upon the character of the water at command are got rid of, without any increase of trouble—indeed, with a reduction of it, for the preservative bath will answer for a limited number of plates without any subsequent treatment with fresh preservative, whether by bath or pressing over.

These experiments also go to show that when the plates are washed with water before applying the preservative there is no need of very long and careful washing, as often said, but that the plate may be simply put into a large pan of water, and left there until the water moistens the surface evenly, or, as commonly expressed, "the greasy marks are gone." So that dry plates made with a bath are brought exactly into line, with respect to washing and preservative, with emulsion plates, and the observations I published some years ago as to short washing, and even its entire suppression, hold equally with plates made with a bath as with emulsion plates.

II.—Acid Redevelopment of Emulsion Plates.

To the remarks made a few weeks since on this subject I have to add the following:—If a washed emulsion plate be developed entirely by the alkaline development it will generally have an opaque sky, which will print entirely white. If the alkaline development be stopped as soon as the image is fairly out, and then a redevelopment with acid pyrogallol and silver be applied, without previous fixing, and, as in the former case, be continued till printing density is obtained, the sky will be distinctly thinner, and will very often "print through." As each plate is, in the above comparison, supposed to be developed until its best condition for printing is obtained, this distinction is certainly remarkable. It is to be observed that in the case of the acid redevelopment the plate is supposed to be removed from the alkaline development at a very early stage—much sooner than generally done. This brings out the characteristics of the acid redevelopment most distinctly. The longer the plate is left to the alkaline developer the more the characteristics of that development will preponderate—that is, the *greater will be the contrasts;* the high lights will be whiter and the shadows blacker.

It seems scarcely necessary to say that in the above remarks as to sky an average sky is meant. If the weather be extremely clear, and the sky a very deep blue with no clouds, it may happen that even with a full alkaline development the sky may not be wholly opaque; and so, also, if the sky be covered with brilliantly-luminous clouds, its impression may be so powerful that even with a development cut short at an early period and finished with acid pyrogallol the sky may come out very dense.

These are exceptional cases giving exceptional results, and not interfering with the principle I wish to make clear, viz., that an acid redevelopment diminishes contrast and produces a plate which, when brought up to printing density, shows thinner skies and other high lights than if it had been finished with alkali. I am desirous to make this meaning clear, because I think the general opinion is different. Formerly I shared this opinion, having been led to this conclusion by observing that in plates which had received an acid redevelopment there was more variety in the high lights. This seemed to indicate that an acid redevelopment tended to contrast. This conclusion is not only not correct, but the reverse of correct. A development which tends to produce contrast diminishes the variety in the high lights, because it is rapidly carrying all these shades of high light towards opacity, so that shades of high light between which there was a certain difference and variety when the alkaline development was half finished have considerably approximated—perhaps even run together—at the end. Had the alkaline development been stopped, and the plate finished with an acid redevelopment, the original variety in these shades of high light would have been better preserved.

A useful remark in connection with all acid redevelopment is the following, which I do not recollect to have seen anywhere mentioned:—It will occasionally be found that a plate prepared by any dry process and let to dry as being finished, will, when examined by daylight, prove to be a little too thin. After receiving a fresh redevelopment (which I think preferable to the intensifying method, because one can stop exactly when one wishes), the plate should receive a much more careful washing than is sufficient on redeveloping immediately after the original development—that is, without intermediate drying; and for this reason:—When a plate is developed, fixed, washed, and dried, the film clings to the glass far more tenaciously than before, and when wetted after drying for a second redevelopment, the liquid does not penetrate it with nearly the same facility. It therefore easily happens that the developing bath gets irregularly between the film and the glass, and, when once there, is not as easily washed out again as after the first development (because the film is not nearly so spongy and permeable). Any of this liquid, if not thoroughly washed out, may produce bad stains in drying.

M. Carey Lea.

A QUICK DRY PROCESS WHICH HAS NEVER PRODUCED BLISTERS.

[A communication to the Manchester Photographic Society.]

I did not intend to publish the dry process I have been working lately, as there are now so many that anyone who has not made himself master of one or other of them has great difficulty in deciding which to use. It is perfectly impossible to try them all; but after experimenting a long while, and having plenty of failures, we get to know the causes of success and failure, and can tell by reading, without further trial, whether a process is of much use or not.

I have had years of hopeless failures with dry processes, particularly with collodio-bromide, and I never had much success till I tried cassava gum as a preservative. Mr. Adin wished me to read a paper, and as I have had no opportunity of practising photography lately, I will give you the process as I last prepared plates by it on September 14, 1875. Those plates have been used for trial as to keeping qualities, and after seven months are as good and sensitive

as when prepared. With strong alkaline development these films are more sensitive to weak rays of light than any dry process I have tried, except gelatino-bromide. For ordinary landscape work they are three or four times as slow as the wet at its best, slower still for interiors, but quite as quick as wet in strong sunlight with an open rapid rectilinear lens.

I will first say a few words about the materials used. Cassava gum is a light, cream-coloured powder, extensively used in calico printing. I find it best calcined for three or four hours in a tin in an oven until it is the colour of dark yellow ochre. It is then soluble in cold water. The solution in three months neither decomposes nor throws down a precipitate, both of which a solution of dextrine will do. Dried in flakes it is only second in solubility to gum arabic. The albumen mentioned is always the well-known preparation of Mr. Ackland. The sugar-candy must be free from salt, the acetic acid from sulphuric, and the water from iron. The collodion must be thin, quick-setting, and of a powdery nature, containing rather less than the usual quantity of iodide, and about two or three grains of bromide per ounce, according to the base of the bromine salt.

All last year I used successfully a mixture of three ounces of Mr. Payne's negative collodion, one ounce of Rouch's collodion, bromised only, and half-an-ounce of pure ether, sp. gr. ·725. I keep the collodion in a filter, and decant carefully into three wide-mouthed pouring bottles for use, adding a little ether, and returning it into the top part of the filter when done with. The glasses have the edges drawn over a smooth stone at an angle, and are then cleaned in hot, weak soda, followed by a long steep in weak nitric acid. They are then rubbed with a clean rag, rinsed well, and dried with clean cloths. I only do six at once, pick out the best side, and give that a breath and an extra polish, and then put in pairs, best sides face to face. Mix one drachm of albumen with four ounces of distilled water, filter into a dish, and lower the face of the plate on to the albumen by means of a pneumatic holder. The edge lowered first must also be raised first, and there will be no bubbles. This is Mr. Swan's method, and is the best and easiest I have tried. The plates as they are coated are put in a rack to drain diagonally, and when slightly drained they are put in another kind of rack, one corner resting on clean filter-paper. This is put in the drying-box, and left to dry spontaneously.

Next, there is a box containing three glass baths, with dippers of glass rod one-eighth of an inch in diameter, doubled at an angle of fifteen degrees, and the extremities made into hooks. These never cause marks in the film, as a bad dipper always does. The first bath contains a neutral, fully-iodised, well-filtered, thirty-grain silver solution, the second a sixty-grain ditto, and the third pure distilled water filtered. Coat a plate with collodion, and let it set well; immerse it in the No. 1 bath, thick end of the film upwards, while the plate is sensitising. Mix one drachm of albumen with twenty minims of a pure forty-grain solution of silver nitrate, stir well, and leave it exactly two minutes; then add thirty minims of ammonia, sp. gr. ·880, and fill up to two ounces with water, allow to settle, and use clear solution. The plate is to remain from three to five minutes in No. 1 bath, then from five to eight minutes in No. 2, and from four to five minutes in No. 3; it is then put on a holder and washed for a minute under a very fine rose. Drain, and flow well for one minute with two drachms of the silver albuminate solution; wash another minute under the rose, then flow with glacial acetic acid one drachm and water ten ounces. Wash under the rose till greasiness disappears, and swill with distilled water; drain, and apply the preservative four times, flowing from a different corner each time. The plate is now put in another rack—the long, thick edge of the film resting on filter-paper, and the holder released to go on with another plate.

The working is so arranged that all the baths have plates in at once, and when all are finished and the rack full the drying-box is closed and left at least twenty-four hours; if opened while the plates are wet drying marks are caused. The object of first drying the plate in a diagonal position, next immersing in a vertical, and, last, drying with the long edge horizontal, is to show at what stage of the process any spots, streaks, or comets are caused by the direction in which they run. The use of the three baths is absolutely necessary to prevent dripping streaks, which are caused by the bad grace with which ether mixes with water and aqueous solutions. The flow of acetic acid is of more importance to the keeping qualities of these films than any other operation; many otherwise good processes are spoiled by leaving an alkali present, which oxidises the deoxidising agent intended to absorb the iodine and bromine, and so renders the plates worthless in a few days.

To make the preservative grind up one ounce of calcined cassava gum, half-an-ounce of pure tannin, and half-an-ounce of sugar-candy. This will keep for years or for ever. For use take forty grains of the above, dissolve in one ounce of hot distilled water, cool, filter well, and it is fit for use, and will keep many months by adding a drop of carbolic acid. When the plates are dry give them a warming on a hot-water tin, and paint on the backing, which is made by grinding about equal parts of Bates's black varnish, india-rubber solution, lampblack, and a little benzine. If properly made this dries quickly, will not rub off, parts with no dust, and, though water is not its solvent, yet a damp rag or sponge easily rubs it off in lumps.

To develope the plates have ready a dip bath full of water, a freshly-made eighty-grain solution of crystalline carbonate of ammonia, a twenty-grain solution of potassium bromide, some good, dry pyro., the acetic acid water as used in the preparation, a solution of ten grains of pyro. and ten grains of citric acid in eight ounces of water, and some old bath solution. Rub off the backing and immerse the plate in the bath. Take for an 8 × 5 plate two drachms of ammonia-carbonate solution, and add from one to five drops of bromide solution, according to the subject—three drops being an average—and a grain or so of dry pyro. Wash the plate well and apply the above quickly, move about well until sufficient detail is out in the shadows, then wash, flow with the acid water, and intensify with pyro., citric, and silver as usual; but do not make the image too intense, as the colour is very non-actinic, like all collodio-albumen negatives. Do not let the edges or corners get dry during development, washing, or fixation, or there will be uneven places called "stains." Fix in clear, neutral hypo., wash very well, and dry by heat, as it gives a better colour than spontaneous drying. These films do not blur more than Taupenôt ones, if they contain as much iodide; but I prefer to back all dry plates, for on difficult subjects I have had blurring in Taupenôt films.

To save trouble I may mention that small quantities of cassava gum may be obtained from Mr. J. B. Payne, or in casks of sixteen or seventeen cwt. from Messrs. Thomas Hyland and Co., 50, Fountain-street.

I had forgotten to mention that my drying-box is an old packing case, painted red, fitted with a light-tight, but not air-proof, door, and a ventilator on the top. J. Brier, Jun.

THE HOT-WATER PROCESS.

[A communication to the West Riding of Yorkshire Photographic Society.

Having been requested to contribute a paper on a dry process which I have worked with much success for a number of years past I willingly comply, premising that what I bring forward will not be new to many here. In fact, some of our members may say that the process is an obsolete one; nevertheless, it is an old and tried process, and one which, in proper hands, can produce all the best results claimed for newer processes. The process is known to photographers as the "hot-water process." I believe the originator of this process has yet to receive the honour properly due to him, for that honour has been disputed on various occasions in the pages of photographic literature; however, we must console ourselves with the saying of one of our wittiest members of parliament—

There is nothing new—
There is nothing true;
Never mind!

And it certainly comes to our relief to be able so easily to dispose of rival claims. But whoever made known this process deserves our best thanks. If I remember rightly Dr. Ryley and Mr. John Parry—both able dry-plate workers—claim the honour. Up to the appearance of this process I may safely say I tried all known dry processes, such as the collodio-albumen, Fothergill, malt, raisin, tea, tannin, and a host of others.

Some years since I devoted three evenings per week to this method of preparing dry plates both for myself and commercially, and what with the steam and the smell of the chemicals making their way into my neighbours' houses I seemed many times on the point of seriously getting into hot water myself. Those persons who did not relish the fun of being "stunk out of their houses," as they said, quietly wished me in a place a few degrees hotter than the boiling water which I used. Such persons I treated with becoming coolness, of course taking their strong expressions as merely the outcome of their warmth of feeling towards me. I allowed them to have the Englishman's privilege of grumbling, and went on my way preparing and perspiring. But, as the French say, let us return to "our muttons."

The hot water process is essentially the wet process up to taking the plate out of the silver bath. The plate is then slided steadily into a dish of distilled water, the water being kept flowing backwards and forwards over the plate until all greasiness has dis-

appeared. Now and then the plate is lifted up with a clean quill pen, so as to allow the water to wash the back of the plate. I pour this water off and follow with two more washes of ordinary tap water. The plate is then drained and the back wiped with clean copying-paper. It is now ready for the albumen solution, which is made as follows:—Take the white of one fresh egg, beat it up into a froth with a bunch of clean quills, then add two ounces of water and two or three drops of ammonia; beat all up together until, after the liquid has been allowed to stand a quarter of an hour or so, it appears clear beneath the cap of froth. In practice I find it is better to make this solution a week or two before its being used, for I had a notion, real or fancied, that it worked better when it was even older than this. On many ocasions I have used it when it has been two or three months old.

After getting this solution filter through a glass funnel, plugged with clean sponge, as much as you think will cover the plate that is being prepared—say for a 10 × 8 plate half-an-ounce. Now place your washed plate in a plate-holder and pour the filtered albumen along one side of the plate in an even wave; then work it backwards and forwards from each side in succession until it presents a nice, even surface, with no air-bubbles appearing, but should you see any prick them with a clean quill. You must now drain the albumen off at one corner, holding the plate for about half-a-minute, or until such time as you have your dish ready for the hot water.

It is no use my telling you how to obtain hot water, but perhaps one of the best methods is to use a gas stove, with a small kettle constantly kept boiling. You pour into a porcelain dish a quantity of the hot water; then take your albumenised plate and push it gently into the dish, leaving it there for half-a-minute. Then lift up the plate with a stout quill pen, and should there be any bubbles on the plate take a little of the hot water and swill them off. If allowed to remain they would leave circular patches on the plate. I then wipe the back of the plate with clean paper, and put it into a drying-box or, rather, tub. With your permission I will now describe the one I used.

When our ancestors brewed their own ale they used what was called a "mash-tub." Having come across one of these ancient articles I appropriated it to my own use—or abuse, as some old toper would remark—and converted it into a plate dryer which answered its purpose admirably. I lined the inside with clean brown paper. The tub being circular, allowed the plates to touch by the extreme corners, thus permitting the hot air freely to act upon the wet surface of the film, and to allow the moisture to escape.

I should here say that in the centre of the tub I placed a long tin bottle, filled with hot water, taking care not to put the bottle in until all the plates were prepared. I will explain the reason for this. Supposing you had prepared two or three plates, and put them into the tub along with the hot-water bottle, and covered all in, by the time you had got two or three more ready to put in those in the tub would be partly dry, and no sooner do you uncover the tub than the colder air, rushing into the warm tub, causes drying marks upon the partly-moist plates. I always finish the plates, and then put in the hot bottle, cover all up, proceed to bed, and dream of the splendid negatives to be produced on the morrow. In the morning the plates are ready for the dark box, to be used on some favourable opportunity. I consider half-a-dozen 10 × 8 plates quite enough to prepare in one evening, and that is the quantity my drying-tub holds.

The exposure with a Lerebours' landscape lens, fourteen inches focus and a quarter-inch stop, on a well-lighted landscape, varies from five to ten minutes. I have given five minutes and twenty minutes for similar subjects and produced good negatives, thus showing the great latitude allowable by this process. Always make it a rule to give plenty of exposure. The maxim of the most successful dry-plate workers is to expose for the shadows and let the lights take care of themselves.

Now comes the developing—one of the most important operations in dry-plate photography; for on the nice judgment and experience of the operator depends whether a picture shall be good or bad. After the plate is exposed put the plate into a dish of distilled water for about five minutes in order to moisten the film, which, when dry, you can scarcely scratch with your finger nail. The plate is taken out of the water and the back wiped clean; then pour on and off some of the following solution:—

Pyrogallic acid	2 grains,
Glacial acetic acid	10 drops,
Distilled water	1 ounce,

adding two or three drops of a simple silver solution. Mix this well with the developer and keep it moving on the plate until you think the negative is sufficiently out, bearing in mind the difference in the colour of the film compared with a wet negative. A negative by this process may look very thin yet at the same time give a vigorous print. The development is rather slow, varying from fifteen minutes to one hour, depending on the subject and the light. Should the negative come up too quickly, from over-exposure, retard the development with a solution of—

Pyrogallic acid	2 grains.
Citric acid	2 „
Water	1 ounce.

Mix some of this with your developer on the plate and you will find matters more under control. After you have developed sufficiently wash the plate well. There is no fear of the film going; I do not remember ever having lost a film from this cause.

The negative is fixed in hyposulphite of soda one ounce, and water six ounces; then well washed, dried, and varnished. These plates keep well, and I have developed some a fortnight after exposure.

I have tried a wash of gallic acid after the plate came out of the hot water bath and found it give great brilliancy, but at the expense of the exposure. The collodion used was the residues or bottle bottoms collected from photographers at a cost of twopence per ounce. Some must have been a year or two old. I never cared so long as it flowed nicely upon the plate. I once got a first-class maker to supply me with a special sort, and I must confess it produced miserable failures.

With regard to this process I cannot do better than quote a few words used by an old and experienced dry-plate worker in The British Journal Photographic Almanac for 1876:—

"During the past summer I prepared several batches of dry plates by an old but little-used process, and the results were of so successful a character that I think I am justified in drawing the attention of my fellow-workers to it. It is what is known under the title of the 'hot-water' process. It is a collodio-albumen process pure and simple, and the negatives have all the purity in the shadows and delicacy of detail for which albumen is always remarkable."

For my own part I can fully endorse the above remarks, and must now leave you to form your own judgment from the negatives which are on the table.

Now that our photographers have the benefit of the Wednesday afternoons, there is no excuse for their saying they have no time. Let me tell such that within half an hour's ride of Bradford we have scenery that has charmed poets and artists of no mean reputation. Whenever a favourable opportunity presents itself get your portable cameras and a few dry plates ready, and away to the woods and glens; and, while your plate is being exposed, sit upon some monster rock and let the welcome sunshine soothe the ruffled feelings engendered by awkward sitters who *cannot* be still. Be, like them "on the move" into the fresh air on every possible occasion; for of all occupations the photographer has, surely, the worst as a nerve exhauster.

In conclusion: I shall be very happy to answer any questions which may be put to me. J. Beldon.

NOTES FROM THE NORTH.

Many attempts have been made to get rid of the bulky gas bags and troublesome *impedimenta* necessary for the production of the oxyhydrogen light, but with the exception of the method devised by Mr. Noton, and said to have been improved by Mr. Young, although he seems unwilling to tell us wherein the improvement lies, nothing very practicable appears to have been done, or at least nothing to which lime-light users have taken kindly.

At a meeting of the Royal Society, held on the 17th inst., Professor Alleyne Nicholson read a paper on some new genera and species of palæozoic corals, which was illustrated by the exhibition of a number of specimens shown in the oxyhydrogen lantern. Professor Nicholson intimated that the arrangement for the production of the gas was new. It was the invention of Mr. Birrell, of Hamilton, and was such that all danger from explosions from mixture of the gases was prevented in a very ingenious way. The light was steady and good, and appeared in every way satisfactory.

Anxious to examine the apparatus thoroughly, I went to the Royal Institution next morning, and was fortunate enough to find Mr. Birrell and his friend Mr. Craig, of Glasgow, packing up. Mr. Birrell, like most inventors, is a thorough enthusiast, and most readily and heartily did his best to explain the construction and mode of action of the apparatus.

The object which the inventor had in view was to produce the oxygen and hydrogen in such quantities and at such a rate as they were being consumed, and to supply them to the jet or burner at such a pressure as might be desired, at the same time keeping down the bulk, so that the apparatus might be sufficiently portable to be easily moved from place to place. He has succeeded so well that, on the

occasion referred to at least, the exhibition was thoroughly successful. The apparatus, when in use, occupied less than two feet of floor space, and when packed ready for travelling forms a package of about ten cubic inches held by one hand, and a small carpet bag by the other. The principal part of the invention is a regulator, of which various forms are included in the patent; but it may be briefly described as a plunger working in a cylinder, and having a lever fixed on its outer end, or a bellows which, being inflated, acts on a lever. The lever is to be loaded to the desired pressure, and is so arranged that when that pressure is exceeded it cuts off the supply altogether if there be no consumption, or admits sufficient to maintain it constant. In the production and consumption of oxygen both forms are used. In the neck of the retort—which is of the usual conical form and made of brass—is fixed a plunger regulator, the lever of which is connected with a cock on the pipe through which the coal gas by which the retort is heated passes. The lever is loaded to the required pressure, and as soon as the gas in the retort reaches that the plunger is raised and the gas automatically turned down. From the retort the gas passes into a reservoir, and from thence to the burner; but on the pipe leading thereto there is a bellows regulator, which, acting in a similar way, regulates the pressure in the reservoir. It is well known that when once the oxygen is fairly started it continues to come off for some time after the heat is withdrawn, and, in consequence, I should have expected to have found some difficulty in maintaining the regularity of the pressure, but Mr. Birrell seems to have overcome that.

The hydrogen apparatus consists of two air-tight copper boxes or vessels about nine inches square, connected, when in use, by two tubes. In the lower vessel is placed the zinc, and in the upper the dilute acid. The latter, of course, finds its way down one of the tubes, and acting on the zinc produces the hydrogen, which soon accumulates to a pressure sufficient to drive the acid back again to the upper chamber. Of course there is nothing new in this, it being simply a modification of Kipp's sulphuretted hydrogen apparatus or Doberener's lamp. On the outlet tube, between the generator and the burner, another regulator is placed in the same way as in the case of the oxygen, and when the weight is properly adjusted to give the required pressure the generation and the combustion of the hydrogen go on simultaneously and satisfactorily.

There is one peculiarity in connection with the invention which should be generally known. Mr. Birrell is evidently an honest and sincere believer in spiritualism, and assures me that he takes no credit to himself for his inventive genius. He believes himself to be under the control of Priestley, Newton, Stephenson, and Fulton, and that he gets directly from them, or one or other of them, all that he has done, or may yet do, for the benefit of the race. Of course my readers will not expect me to commit myself to this opinion; but if there should really be any truth in it, spiritualism ought to rise in public estimation, as at last the spirits are really returning to this mundane sphere for some good purpose. Mr. Birrell is a photographer as well as inventor, and has promised to give me many useful "dodges" and "wrinkles" which are from time to time communicated to him, so that we shall shortly see what those once great names can do for us.

If anyone wants a wrinkle in advertising, here it is:—A photographer, who had attained a large amount of success in another country, recently came amongst us, and fitted up a very handsome studio and suite of business premises. He freely intimated, through the ordinary advertising mediums, his advent, and promised great things in carbon, but not greater than he had shown he could do. Thinking, probably, that that method was too slow to bring about the desired result, he set about the preparation of a large number of *carte* specimens of very fine chromotypes, and posted them, along with a very neat lithographed circular, to every likely person in the city, and the county too*. To make the scheme perfect, specimens sent to the county people should be followed by a call, not "on purpose," of course, but "happening to be passing, and took the liberty of submitting for inspection a collection of fine, absolutely permanent, prints." Of course it would be *infra dig.* to solicit an order, but an invitation to visit the galleries when in town would do the business. The expense will be very great, but it will pay.

John Nicol, Ph.D.

ANTIMONY PHOTOGRAPHS.

At a recent meeting of the Chemical Society a paper by Mr. Francis Jones, of Manchester, was read, describing a process for producing photographs by the aid of antimonietted hydrogen and sulphur, and, accompanying the paper, were some prints of fern leaves which were stated to be very pretty.

An account has not yet appeared in the Chemical Society's *Journal*, and until Mr. Spiller's paper was read at the meeting of the Photographic Society of Great Britain the only published particulars I had seen was a brief description in the *Chemical News*. Working upon the indications there given I made a few experiments, but soon came to the conclusion that the process was little likely to be of practical use for producing photographic prints, and still less likely to be of any service as a photometric agent, as had been suggested. As, however, an amount of publicity has been given to it through the expectations raised by the title of Mr. Spiller's paper —*A New Method of Photography*—I think it possible that a few words of description which will enable anyone, with little or no chemical knowledge and without special apparatus, to experiment a little way with this new agent may not be found uninteresting. The caution may again be given that the gas has been stated to be poisonous. I do not know of any case having occurred to prove that it is so; and the various text-books are uncertain upon the point. Still it is well to be cautious, and the analogy between the highly-poisonous arsenic compound and the antimony one renders it likely that danger might ensue from the inhalation of the antimonietted hydrogen gas. This alone, it seems to me, would suffice to prohibit the use of the new process, if even there were no other difficulties in the way.

A sufficiently pure gas may be obtained by adding a small quantity of impure chloride of antimony (purchasable at most chemists' shops under the name of "butter of antimony") to any hydrogen-generating apparatus. For instance: a few zinc clippings may be added to a mixture of hydrochloric acid and water—about one part of acid to five of water—contained in a small wide-mouthed bottle. The effervescence that ensues is caused by the production and disengagement of hydrogen gas. If, now, the antimony solution be added antimonietted hydrogen is at once given off also, and the issuing gas is a mixture of the two.

It is not likely that many of my readers will go to the trouble of conveying it through a tube into a felt pad at the back of a printing-frame, but a print of a pattern of lace or a fern frond may be easily obtained by other means. If the sulphur paper be wrapped round the bottle, and the lace, &c., attached to it by means of a couple of elastic bands, it is at once in a position to be printed. The requisite atmosphere of gas will be obtained by placing the bottle, with its attached paper, &c., in a saucer containing a small quantity of water, and then surrounding it with a common glass tumbler. As the gas is produced it will bubble from underneath the tumbler, but will permit no air to enter. The whole can then be exposed to daylight or sunlight—the relative rapidity of the two being found to be about the same as in silver printing, but the operation of printing slower than with silver. The resulting image will be of a tolerably-rich colour, verging between red and orange.

To prepare the sulphur paper Mr. Jones used sulphur dissolved in bisulphide of carbon poured on like collodion. It has been suggested to dip the paper in hyposulphite of soda and then wash with an acid, when sulphur would be precipitated. If a piece of white paper with a rough surface—such as fine white filter paper or the back of a piece of albumenised paper—be rubbed gently over with best "milk of sulphur" (also to be bought at any chemist's) every purpose will be served; and thus, with a very few minutes' trouble, anyone may be able to form a rough estimate of the value of the "new method of photography." G. Watmough Webster, F.C.S.

FOREIGN NOTES AND NEWS.

Annual Report of the Vienna Photographic Society.—The "Travelling Album."—Cost of Carbon Prints.—"Plasto-Photography" and "Silbo-Photography."

The annual report of the Vienna Photographic Society has just come to hand in the form of a special number of the Society's organ, the *Photographische Correspondenz*. The affairs of the Society seem to be in a flourishing condition, the funds being in a satisfactory state, and the number of its members having increased, up to last December, to 306 ordinary and twelve honorary members, five of the latter being foreigners. In the course of the Society's year which has just run its course nine ordinary meetings and one extraordinary meeting were held, at which numerous interesting papers were read and discussed. The year was also signalised by a very successful exhibition at Vienna, by the success of many members of the Society at the exhibition at Brussels, and the enlargement of the Voigtländer fund.

* This method of advertising is extensively adopted by photographers in the vicinity of London, and long since we bore testimony to the excellence of the system.—Eds

The Vienna Photographic Society possesses a very useful institution called the "Travelling Album," which circulates amongst the provincial members, and keeps them *au courant* as to all articles in the shape of pictures laid before the Society. The "Travelling Album" consists of five rather bulky collections of pictures, which are passed from one member to another; but we are glad to see that its utility is to be greatly increased by a classification of their contents, and their subdivision into smaller packages, such as can be sent by post. This reform will, doubtless, greatly increase the rapidity of the "album's" circulation, as the postage of a number will cost but little in comparison with the carriage by rail of the former unwieldy volumes.

In the course of a discussion on the comparative cost of silver and carbon prints—with, of course, the usual differences of opinion—the *Photographisches Wochenblatt* gave, on the authority of Herr K. Schwier, 2·20 marks (2s. 2¼d. sterling) and 4·20 marks (4s. 2¼d.) as the respective costs to the producer of one dozen finished *carte* or cabinet portraits; and in the current number of the *Photographisches Correspondenz* the same figures are given by Herr C. Schierer as the cost price of one dozen *carte* or cabinet prints, inclusive of mounts, trimming, pasting, retouching, burnishing, and allowance for the deterioration of utensils. The calculation is made in Austrian money, which is then converted into marks, and for twelve carbon prints by double transfer runs thus:—

	Carte Size.	Cabinet Size.
Carbon tissue	fl. ·17	fl. ·34
Single transfer paper	,, ·06	,, ·12
Double ,, ,,	,, ·07	,, ·13
Chromium bath (almost valueless)	,, ·01	,, ·02
Alum bath, dissolved resin, &c.	,, ·02	,, ·04
Twelve mounts	,, ·08	,, ·24
Trimming, pasting, burnishing, spotting, &c.	,, ·25	,, ·40
Collodion coating (for pictures with a high gloss)	,, ·10	,, ·20
Warming of water	,, ·06	,, ·12
Cost of negative (according to Schwier)	,, ·40	,, ·70
Quota towards repayment of deterioration of utensils, &c.	,, ·08	,, ·14
	1·30	2·45

Now 1·30fl. is equal to about 2·20m., or as nearly as possible 2s. 2¼d. of our money, and 2·45fl. are equal to about 4·20m., or 4s. 2¼d. of English money. These totals, as will be seen, correspond with those previously given for silver prints, and it would be interesting to know if the experience of our English carbon printers bears out the conclusion that carbon prints, besides being more permanent, can be as cheaply produced as silver prints; but it is to be feared that patents and royalties militate against that conclusion.

Perhaps some of our readers may remember that at a recent meeting of the Berlin Photographic Society a specimen of a new secret process, called "plasto-photography," was shown and pronounced, though very beautiful, to be but a development of the well-known "Denier effects." This statement has called forth a disclaimer from M. Denier, who writes in the *Photographische Correspondenz* to the following effect:—"Having long read with astonishment the many contradictory opinions expressed in the German professional journals with respect to my process called 'silbo-photography,' the identification of my process with a new secret process called 'plasto-photography,' which is now in the market, has at length induced me to make the following protest:—That, though often asked to do so, I have never either sold or revealed my system to anyone, nor have I been able to recognise as identical with my process any of those that have been reported to be identical with it; and I assure you that there was not one picture exhibited at either the Brussels or Vienna exhibition identical in treatment with my process as used by me since 1870, and in this statement I am borne out by jurymen of both exhibitions." Then follows the jurymen's confirmation of the protest; so it seems that we are still in the dark as to what is meant by "plasto-photography."

ART IN RELATION TO PHOTOGRAPHY.

[A communication to the West Riding of Yorkshire Photographic Society.]

The subject of art in its relation to photography is one to which, I am inclined to think, photographers as a body do not give that careful consideration which it deserves. Too much attention is given to the chemistry of photography, and too little to its art aspect; to me it is quite a relief when the journals devote a few pages to the consideration of photographic art, instead of long discussions on the affinity of the halogens and personal disputes, in which no particular victory is achieved by either party.

Much has been written on the æsthetics of photography, but much still remains to be written before the mass of photographers are educated to the standard of artistic excellence which our beautiful art requires and deserves, and until such an end is attained so long will photography be termed merely "mechanical."

There are many to whom these remarks do not apply, but their number is small compared to the large numbers of photographers in practice. I could mention names which are "familiar in our mouths as household words"—of men who have striven most earnestly and have succeeded in producing works that can safely rank amongst art productions, bearing, as they do, the self-evident stamp of a master intellect; who used light as an artist uses his pencil, simply as a means by which to convey and publish the idea latent in his mind. These are men who have looked to the end of art, which is the refining and ennobling of the mind and character.

In olden times, when art—such as painting—was in its infancy, the sister arts of poetry and music were used effectively as incentives to purpose and action; so at the present time may a man be elevated and improved by the study of a real work of art. The more familiar he becomes with nature and art the more does such insight refine and purify his character, and determine his influence upon the circle of society in which he moves. Successful work depends, to a very large extent, upon the personality of the man, and a successful application of whatever ability he may possess cannot be made without a stock of good general knowledge previously treasured up in his mind.

The education of the photographer is a subject of vital importance with regard to the future status of the art. Other professions have their training colleges, their academies, and establishments where the student is put through the necessary course of study to fit him to occupy an honourable position in his profession; but the photographer—who, of all men, requires this preliminary training—has to pick up his knowledge in the best manner he can. I do not remember a profession where more general ability is required than in photography, being, as it is, dependent upon so many branches of science in addition to art principles; it is, therefore, advisable to obtain at least a general acquaintance with the sciences connected therewith, and a very liberal knowledge of the rules of art is necessary and most essential to success.*

The art, I admit, is, to a large extent, still in its infancy; but it has already arrived at such a degree of excellence that the subject of a systematic education for the photographer of the future has become an important—I had almost said an imperative—consideration. Though photography now numbers in its ranks many artistic manipulators, still it is not difficult to find productions which in their general appearance remind one of Japanese paintings. An absence of all beauty of form or of pleasing light and shade, and a total disregard of the rules of perspective, are their distinguishing characteristics. They are merely a map of the features, bearing no more resemblance to the person they represent than does a map of any country to its beautiful, undulating hills and wooded vales. This, it is probable, is a natural outgrowth of the appearance of a new art, the preliminary steps of which are so easily acquired.

It will be within the remembrance of most of the members of this Society that the time was when photography had an acknowledged position, and had become a sort of *dernier ressort* for those who had unsuccessfully tried other modes of obtaining a livelihood. If they were by nature or education, or perhaps the want of it, unfitted to take a position in the world of commerce they would obtain a camera and lens and the few other necessaries required, set up a studio, and forthwith style themselves "artists." This state of affairs, fortunately, could not last for any great length of time, as the public were, by means of the few really good artists, being gradually educated to appreciate a higher class of work; and it is now, generally speaking, the really careful and studious photographer who succeeds—he who can combine the necessary artistic and chemical knowledge along with a moderate amount of business energy and tact.

The collodion negative processes are, I think, about as perfect as the most critical could wish. An enhanced degree of rapidity may, possibly, be desirable; but for ordinary work we can scarcely hope to secure finer technical results than have already been attained. Our aim, therefore, must be pictures of a higher order of artistic excellence.

The business of art is to choose and combine such forms and effects as shall best convey to the mind of the spectator that idea which had existed in the mind of the artist. Figures under the influence of any emotion change very rapidly their position; the artist must, therefore, select the pose most suited to express the emotion he intends to convey. "Beauty," says Emerson, "is the moment of transition, as if the form were just ready to flow into other forms." Thus it is that the line of

* As aids to the study of the various branches of art education necessary to the accomplishment of this end, I would venture to suggest that a careful study of Burnet on *Light and Shade and the Education of the Eye* would be of great use; also a series of lectures delivered at various times before the Royal Academy, published, I believe, by Bohn. As studies of drapery the beautiful outline drawings by Flaxman are, I think, unequalled—at least by anything I have ever seen.

beauty is described by curves, a gently-flowing change from one line into another, thus linking the various parts of a composition together, carrying the eye by an easy transition from one part of the picture to another.

It may be said that the province of the photographer in portraiture is to represent figures in repose. Though this is often the case, it is not always so (see the spirited portraits of celebrated actors); but even if it were, repose has its changeful moments, its graceful motions, and harmonious lines—indeed, a poetry of its own. In art, as in other allied subjects, many little things do not necessarily make a great one. The true artist, then, will be careful to reject everything that does not tend to the enhancement of the object in view, so that the eye of the spectator may at once be led to the principal object of the picture, and may see that the artist has been well acquainted with the subject under treatment.

A proper distribution of light and shade is of the first importance. Of the various masses one should be principal, and the chief object of interest there centered—in portraiture necessarily the head—and to that object everything else should be made subservient. Subordinate light must be introduced to prevent too great monotony in the shadows and half-tones. The proper distribution of these is of great importance, lest anything should be introduced which may destroy the impression intended to be conveyed, as nothing should equal the force with which the principal object is made out.

A judicious disposition of drapery greatly assists balance and the breaking-up of lines, and should be so arranged as to give weight to the figure, but, at the same time, avoiding too great a regularity of opposing lines, so that the composition may not look formal. The background, too, should be simple and unobtrusive, with as little detail as possible —quite the reverse of too many of the painted backgrounds occasionally used, which are much too "pronounced" for artistic feeling. If the background be a landscape it should be broadly and simply treated—merely indicating a scene, not detailing it. The grouping of a few well-arranged but indistinct masses of light and shade will produce a better effect than the most elaborately-painted background ever executed. In most pictures, as now produced, a plain, graduated background will produce sufficient effect to relieve the figure and prevent it from looking inlaid or cut out.

It is impossible within the limits of a short paper like this to enumerate the various principles involved in the production of a work of art; but sufficient will have been said to point out the necessity of carefully studying existing examples and works on the subject. However advanced you may be there is still a grander future. "Art is long and time is fleeting," and we need to bend all our energies to the task of giving our art the position it deserves.

Much has been said on the subject of the artistic manipulation of the negative before printing—in other words, negative retouching. It is often urged that a photograph should be untouched; but I cannot in any way agree with that view of the case. I do not consider photography as an end, but only as a means to an end. A photograph, as a photograph only, has little interest for me save when it represents some mechanical arrangement or object of scientific or historical interest, when, of course, pure photography is desirable and necessary; but when used for purposes which may be called "artistic," it is only of value in proportion to the amount of artistic feeling displayed. A photograph may be a triumph of chemically-clean and careful manipulation and yet be what is scornfully and yet sometimes truthfully called, as I before said, "a mere map of the features." Therefore I consider everything legitimate that has for its object the enhancement of the pictorial value of the photograph.

The true and worthy end of retouching is not to remove every objectionable feature—or, rather, everything that the retoucher may consider as such—from the sitter's face, and to fling around the whole an artificial puff-powder appearance; but to give an artistic delineation of existing features which shall be, at the same time, faithful and rational, by removing accidental defects of the face, or defects incidental to the process of production, owing to the varying colour of the human face and the microscopic delineation of the lens.

The degree of success attained in this branch of the art is dependent upon a sound judgment, and a most certain disregard of that sentimental prettiness which has become so popular, and which has, unfortunately, given the opponents of retouching such good grounds from which to argue against it. But it is not legitimate to argue against the use of any process because some injudicious individuals choose to abuse the power it bestows. I have seen many fine untouched negatives and prints from them, but can safely say that I never yet met with one that could not in some way or other have been improved by a few judicious touches of the artist's pencil; and I have seen negatives, that untouched would have yielded average prints, absolutely ruined by the retouching process.

To produce the best results both operator and artist must work together. The operator must produce a clean, well-lighted, and balanced negative; the retoucher must do his work judiciously, and then, and then only, may success be hoped for. Above all, be careful that your retoucher be an artist—not necessarily carrying the appendage "R.A." at the end of his name, but one, at all events, able to finish a picture well in black and white, a good knowledge of the drawing of the human face being a primary accomplishment for anyone who intends retouching negatives well. The small heads of full and half-length figures do not require a great amount of skill, the removal of defects of the skin and gradations in tone from varying complexions being sufficient. It is in the heads of larger sizes where the ability is needed—such as the Berlin *cartes*, the so-called "Rembrandt" pictures, and the larger sizes of portraits.

An exhaustive description of the various methods of retouching would be far too long for this paper; but as it plays such an important part in the production of artistic work a short description of the method may not be out of place.

Many modes of preparing the negative to receive the work have been recommended. Some artists, however, dispense with preparation altogether, working on the film with brush and needle; others apply to the unvarnished negative powder colour to secure the highest lights, then varnish, and remove defects with water-colour; others, again, will remove defects with the pencil, and deal with the lights on the back of the negative, either by painting directly on the glass, varnishing with matt varnish and pencilling, or straining paper over the negative and working on that. Various as the methods are they are all capable of producing good results when property directed; the choice, then, simply becomes a matter of convenience.

At one time I almost exclusively used Payne's grey with a little gum water as a retouching colour; but it possessed the great disadvantage that in damp weather, or if the sensitive paper were not perfectly dry, the silver adhered to the colour, the consequence being that in each successive print the work became more and more opaque, until it printed as absolutely white spots, and sometimes the work would adhere to the damp paper, coming off with it when taken out of the frame, to the serious detriment of the negative and derangement of the temper of everyone concerned. If the negatives were printed under mica these objections were done away with; but mica is somewhat difficult to obtain, and withal rather expensive, so that eventually I entirely discarded the use of colour, and confined myself to the pencil.

In order to work easily with the lead pencil it is necessary in most cases to roughen the surface of the varnish. There are varnishes made that do not require it; others will roughen by the simple application of friction; but I prefer a tolerably hard varnished requiring the application of pumice-stone to produce a matt surface.

The first-named variety will be most easily worked with pencils from B B B to B; the second with from B to H; while that requiring the application of pumice-stone will be found to have a very keen tooth, and require for working easily from F to H H H H. I usually procure my pencils in cases of Faber's manufacture, containing all grades from H H H H to B B B B, and find them the most generally useful collection. You are apt to accumulate in time a number of the extreme grades, but the B's come in useful for working on matt varnish or paper, *à la* Lambert.

A number of stumps of varying sizes of leather and paper will be found extremely useful for putting in the masses of light or lighting up any dark shadows that may require modification. The paper stumps being firm allow you to deposit a portion of lead powder exactly where required, and, as it were, push it into the grain of the varnish. The leather stumps are more yielding, and serve to modulate and soften the lights as applied with the paper stumps.

Great care must be used in stumping on the negative, as if done indiscriminately it will result in the production of what I once heard a photographer call "turnip-faced abominations." Make it a rule to do as little as possible; rather have to do more after printing a proof than regret having done too much. Should you, however, find that you have overdone any part, a little turpentine applied with a soft rag will remove all the pencil work and leave you open to commence again.

For large negatives nothing can equal the method claimed by Messrs. Croughton and Lambert of stretching paper on each side of the negative, removing defects on the film side, and obtaining the broad effects of light and shade by bold hatching and stumping on the reverse side. An enlarged negative can thus be made to print almost equal to a good direct negative. The background, if tolerably thin, can be graduated and modified to any extent—even to the producing a landscape effect on a plain ground.

Large direct negatives often print somewhat hard, probably owing to slight under-exposure, as the large lenses are so much slower than small ones. In such cases I have often heard it advised, and it is a common practice, to tone down the picture by exposing the paper to light either before or after printing. I would say most carefully avoid any exposure of the whole of the picture after printing. If it have any tendency to hardness place over the whole a sheet of plain glass of moderate thickness, and on it paint over the higher lights and any portion you may wish to screen, with any colour you choose, in oil (Prussian blue is very useful), graduate it by dabbing with the finger, and expose to light until the half-tone is sufficiently printed; you thus secure a brilliant effect, devoid of all hardness and without degrading the lights, which are so necessary to the production of a good picture. The method is simple and capable of producing excellent results under the direction of an artistic manipulator.

In conclusion: I would in all humility say—if your first efforts are not successful try again and again; to the earnest student, it has been

said, success in some measure is never denied. It is a good sign when our work does not reach the standard mentally aimed at, as it indicates a knowledge or recognition of something superior; indeed for the artist who is satisfied with his productions there is little hope of his ever reaching a very high standard. Perfection exists a long way before us, and few of us, if any, can hope to attain that goal; yet, whatever we attempt, let us not be satisfied until we have succeeded to the best of our ability. We may not all achieve the highest rank, but whatever be the position we do occupy let our earnest endeavour be to make our work worthy of our art. J. Crosthwaite.

Meetings of Societies.

MANCHESTER PHOTOGRAPHIC SOCIETY.

The monthly meeting of this Society was held at the Memorial Hall, on Thursday evening, the 13th inst.,—Mr. G. T. Lund occupying the chair.

After the minutes of the previous meeting were read and confirmed, Mr. John Brier, Jun., read a paper on *A Quick Dry Process which Has Never Produced Blisters.* [See page 196.]

Mr. Brier exhibited several excellent negatives by his process; also, the racks and backing-stand used by himself in the practice of the process.

There was no other business before the meeting, and no discussion took place on the paper. As usual, when a meeting has fallen on the eve of Good Friday, everybody seemed anxious to get away.

A vote of thanks was passed to Mr. Brier for his paper, and the meeting adjourned.

LIVERPOOL AMATEUR PHOTOGRAPHIC ASSOCIATION

The ordinary monthly meeting of this Association was held on Tuesday last, the 25th instant, at the Free Public Library and Museum,—Mr. W. Atkins, President, in the chair.

The minutes of the previous meeting were read and confirmed.

The Rev. H. J. Palmer exhibited some gelatino-beer negatives which he had taken during a trip into Yorkshire. With thirty-six plates he had returned with thirty-six negatives. These, however, were from plates prepared a short time before starting. Some plates prepared with beer, made a few months ago, were all failures, owing to a kind of fungus which seemed to have broken out all over the plates, completely spoiling them. This was owing, he believed, to damp getting to his plates, steam having had access to the room in which they were kept in deal boxes.

The President stated that he had lost some plates which had been kept in a deal box.

It was remarked that Mr. Kennett had pointed out the danger of keeping plates in such boxes, recommending mahogany instead, as the turpentine in the pine wood had the effect of destroying the sensitiveness of the gelatine plates.

Mr. P. Mawdsley said that he had no doubt the exhalations from the deal plate-boxes would have a bad effect on any sensitive plate, especially if the wood were new.

The Rev. H. J. Palmer found that the plates prepared with water alone added to the pellicle had not deteriorated at all, although he had had them more than a year in the boxes. It was, therefore, probable that those prepared with beer absorbed the moisture more readily, and the sugar in the beer had been the cause of their spoiling.

Mr. L. W. Weber handed round some negatives which he had made with half beer and half water to dissolve the gelatine pellicle. These were exceedingly satisfactory, and had not shown any signs of deterioration.

Mr. W. B. Roberts showed some negatives made according to the formula recommended by Mr. Kennett, namely, one teaspoonful of mild ale and two drops of a twenty-grain solution of bromide of cadmium to the ounce of emulsion. This required an increase of the exposure to about one-sixth, and density could readily be obtained.

Mr. Palmer said that the addition of bromide of ammonium instead of the cadmium was also good.

The general opinion was, however, that all these additions only lessened the sensitiveness of the plates, and that the addition of a small quantity of beer would be all that was required.

A discussion ensued as to the necessity of backing these plates.

Mr. Palmer and the Secretary stated that for interiors it certainly was necessary.

Mr. Mawdsley said that for ordinary landscape work plates prepared with the Liverpool emulsion did not require backing, but for subjects presenting very strong contrasts and requiring long exposures it was necessary to back. He (Mr. Mawdsley) exhibited two prints of the same interior—one from a plate backed, the other from one that was not. The difference in favour of the backed plate was most decided.

Negatives and prints were exhibited by Mr. J. A. Forrest, Mr. W. H. Kirkby, and others, and Mr. J. H. T. Ellerbeck showed some beautiful lantern slides of insects and leaves.

The President announced that there would be an excursion to Frodsham on Saturday, the 6th of May.

The Rev. H. J. Palmer said that he would be prepared to photograph a group of the members at the commencement of the next evening meeting.

The meeting was shortly afterwards adjourned.

WEST RIDING OF YORKSHIRE PHOTOGRAPHIC SOCIETY.

The ordinary monthly meeting of the above Society was held on Monday, the 3rd instant, at the Commercial Hotel, Bradford,—Mr. Howarth in the chair.

The minutes of the preceding meeting having been confirmed, Mr. Passingham was elected Treasurer in place of Mr. Rogerson, resigned. Mr. Isidore was elected a member.

Mr. J. Beldon then read a paper on *The Hot-Water Process* [see page 197], and exhibited a number of negatives by the process described, which were considered of good quality. In reply to a member,

Mr. Beldon said he had never lost a plate by breakage owing to plunging into hot water, but had broken a dish or two.

Mr. Burrow said he had worked the process at the same time as Mr. Beldon, and had been tolerably successful with it; but he had found the emulsion process the best and most generally successful. There was little trouble in preparing: albumenise the plate, pour on the emulsion, and the plate was ready. He had kept the emulsion for twelve months and had found it of as good quality as when fresh. He had had several quantities, and found but a very slight variation in them, the last he had being the best.

Mr. Whitley thought the process was rather slow, and considered the want of sensitiveness a serious objection, as rapidity was the aim at the present time.

Mr. Beldon was of opinion that rapidity in general cases was of less importance than certainty.

A cordial vote of thanks was then presented to Mr. Beldon for his interesting paper.

Mr. Beldon, in replying, said he should like some members to exhibit some specimens of negatives by some of the later processes, as he had not worked any of them.

Mr. Burrow promised to exhibit a number of emulsion negatives, and to read a paper on their production, at the next meeting.

Mr. Crosthwaite then read a paper on *Art in Relation to Photography* [see page 200]; after which the conversation turned upon combination printing, with especial reference to a number of pictures by Messrs. Robinson and Cherrill.

Mr. Crosthwaite said he was of opinion that, with one exception, the pictures were very successful attempts in connection with one of the most difficult phases of photography—one which could not be successfully carried out unless the photographer had a cultivated taste and a good knowledge of the rules of art.

Mr. Batho considered them as most praiseworthy endeavours to elevate photographic art; and he thought the gentlemen named deserved the thanks of the whole profession for the impetus which they had given to the higher branches of the art.

The usual vote of thanks having been tendered to Mr. Crosthwaite for his paper, the meeting became of a social and conversational character, and was shortly afterwards adjourned.

Correspondence.

EXCESS OF SILVER IN GELATINO-BROMIDE.

To the Editors.

Gentlemen,—"Franklin," and others who give "wiggings, drawn mild," need not have the slightest suspicion that their chastisements will be ill-received—at least by me. He is quite at liberty to try to "catch me in my own trap," only I am afraid that he has failed this time. This I will proceed to show.

"Franklin" will remember that the same number of the Journal (No. 831) in which an account of his experiments appears contains, also, a letter from myself detailing my experience with silver in excess in a gelatine emulsion, "*à la* Carey Lea," and also referring to another emulsion made without iodide. He will thus understand that my "ground" was "laid out," and even "broken" previously to my opportunity of reading his "notice-board;" for, these experiments being undertaken with a view to shedding a clearer light (?) on the "Carey Lea process," the cadmium bromide was used in the proportion set forth by Mr. Lea, and the ammonium bromide as a substitute for the ammonium iodide, ammonium bromide, and cobalt chloride of the same formula, in order to preserve some analogy (?).

My idea, hitherto, has not been so much the making of the most rapid emulsion as the establishing of a principle. For this reason it is well to experiment with the salts usually made use of in ordinary emulsion work, otherwise the zinc and barium bromides might be tried. Certainly ammonium bromide *is* in general use, and I have nothing to say against it; but in my case, as I have said, I have, as yet, preferred to use the salts proposed by Mr. Lea for the reasons already set forth.

It is curious that cadmium should work slower than ammonium bromide, as this is not apparently the case with collodion. Again: ammonium is generally credited with "density," and cadmium with somewhat less of this property. It is, also, "curious" that a larger

excess of silver does not give so rapid a plate as a small excess. From this it may be presumed—firstly, that really absolute combining proportions would be best, if only possible; and, secondly, seeing that a large excess of silver has not the good effect it has in a collodion emulsion, that silver in excess—as suggested in my last letter—has no action on the bromide of silver, but rather on the pyroxyline. When I say "no action," I mean not that conducing to rapidity: it may have some effect, as evinced by a large excess making a slower emulsion.

I notice that "Franklin" uses a rather large proportion of gelatine; this fact, combined with that of ten grains giving a more rapid emulsion than nine, makes it just possible that the extra quantity of silver bromide formed may conduce to sensitiveness, though this theory rather upsets that of the advantage of a very small excess of silver.

"Franklin" says that his formula is not so rapid as "Kennett's extra rapid." But is it even more rapid, or as rapid, than the "Kennett ordinary"—that published two years ago? Here is the rub; and this is another reason I have for doubting the action for sensitiveness of silver in excess.

There is one point I have not referred to in this connection with regard to collodion emulsion; it is that, after an emulsion has been acted on by silver in excess, this excess may be converted by a soluble bromide or chloride without impairing the sensitiveness, thus showing, I think, that the action of the silver is on the pyroxyline, *not* on the silver bromide.* It may be said that silver in excess must have some action on the silver bromide, because an emulsion, on keeping, becomes very rapid, *thin*, and *foggy*; but this is to be explained, I think, by the "organic element" ceasing to combine to give density with the reduced bromide, and, also, by the mechanical state of the film, which no longer restrains the action of the developer on the silver bromide, leaving the latter somewhat in the state of pure bromide of silver deposited on a glass plate.

"Franklin" has washed off "acres" of gelatine films (I do not envy him this part of the proprietorship)! I cannot boast of being able to measure my "preserves" (I only wish they *were* in one sense!) by the "*acre*," but certainly I have passed my glass "*rod*" over a very large surface of the same material. Verily, "Franklin's" preserves are large! Trespassers!—beware! "Franklin" may have been rather struck by my, perhaps, too bold assertion that he had delayed the operation of "posting" his "notice-board. It appears that I was wrong, and that he *did* "rush into print," equally with myself, upon making sure that he had "dug up" an "ascertained fact." From the fact that he had been at work for the last two winters, as well as from the general tone of his paper, I drew the conclusion that the "notice-board" did not "go up" immediately "like a rocket." Let us hope now that it will not "come down like a stick!"

While I write this I am making an emulsion after "Franklin's" directions. I am inclined to think that, while that gentleman used a theoretical quantity of ·66 grain (about) of silver in excess, he may, in reality, have just hit on the combining proportion, especially considering that the gelatine, if not soaked previously in distilled water, would be certain to contain sufficient chlorides, &c., to convert the theoretical excess. We have only ·66 grain to convert, and the necessary chloride for this might be only ·25 grain to each 22 grains of gelatine, *i.e.*, an impurity in the gelatine to the extent of about one per cent. Did "Franklin" test his first wash-water for free nitrate? and, if so, did he detect any? I have done so with mine, but the water is *slightly* "milky," showing, I suppose, that both bromide and free silver were washed out together—that is, they had not entirely combined.† This makes it more difficult to test in the usual way, by which methods I can discover neither bromides nor nitrate. However, a little tannin placed at the bottom of the tube has discoloured slightly, which seems to indicate silver. Nevertheless, as the wash-water would contain, at the best, only ·07 grain to the ounce, the quantity is exceedingly small for any but the most delicate test. The water might be evaporated down with nitric acid to prevent the combination of the silver with the organic substance; but this would not, I think, prove infallible.

There is one failure I often experience with gelatine, of the cause of which I am not certain. A plate is coated, perhaps, too thickly, so that probably the surplus flows to one or other of the corners; the consequence is, that such a corner takes a long time drying. On developing, this portion of the plate is the first or, probably, only part of the plate that blisters.‡ Now is the cause decomposition of this particular part, unequal thickness of film, or excess (comparative) of moisture in it? I have noticed a minute network of depressions sometimes in these parts. If decomposition were the cause, an efficient method of quickly drying the unequal film would eliminate this cause from the above category. Is any one certain of the real cause?

In an article, last week, you suggest gelatino-bromide as a substitute for collodion in distant countries. Now there is one failing in gelatine, which has not yet been dwelt upon, and which might render it unsuitable for the traveller in countries where transport is difficult to obtain, and, when obtained, precarious. Gelatine films cannot be "transferred"—at least by any method of which I am aware. It is true that the plate may be previously coated with collodion; but, at the best, this necessitates the presence of the would-be absent substance. It may be said:—"Why transfer? If a reversed negative is wanted, obtain one by means of the camera, or 'dusting-on' process." Well, of course, reversed negatives will not be required by the traveller; but will it not be advantageous to him to be able to send home, or carry with him, pellicular negatives, instead of glass? Of course he might discard glass altogether, and take some form of "sensitive tissue;" but very few photographers—especially "practical" ones, as they call themselves—would venture to commit the fulfilment of their hopes to a substance of which they have had no experience. I do not mean to say a word against "tissue;" on the contrary, I believe that it would be extremely "handy" on an expedition such as has been referred to. But I remember that "tissue" is a new "notion"—newer, even, than gelatine emulsion—and the "conservative" feelings of the "practicals" must be respected.

Mr. Kennett's revelations with regard to pine plate-boxes are quite startling; they affect me like an electric shock, making me nearly jump out of my boots—not with delight, you may be sure! This spasmodic effect may be partly accounted for by the fact that I have just had a "drying-cupboard" made of deal. Now, if cold plate-boxes affected the dry plates, how much more should a warm "drying-closet" made of the same material? May not dry-plate workers, for years past, have been sensitising and *de*-sensitising their plates by drying them in deal drying-boxes—not to mention the storing of them afterwards? But these thoughts are not very comforting. I am, therefore, glad to find that a "Kennett" plate kept in a deal box, for about nine months, and a collodion dry-plate kept in another deal box—the inside of which wae, certainly, coated thinly with paraffine—for a year, are apparently none the worse for their trying (?) usage.

It appears that Mr. Kennett has satisfied himself that *pine* is deleterious to dry plates; however, I believe that "pine" and "deal" are not *quite* the same thing, and this may account for my boxes not affecting the plates. Deal is a light, cheap wood, and it would be no little sacrifice to have to give up its use for certain purposes. Is that the experience of others?

Does anyone find any difficulty in photographing clouds, with old Sol appearing as a well-defined black "shot" in the negative? If so, I can guarantee that the old gentleman's beaming countenance may be successfully "mapped" if gelatine emulsion be stained rather deeply with rosaniline, so that the plate would require about ten times the exposure of the plain emulsion. It is, I think, necessary that the sun be slightly veiled by light flecks of cloud, otherwise the action might be too great, as well as, the sun being against a "ground" of light-blue sky, the contrast might not be sufficient. I have a few "Kennett" plates which were prepared last year with too much dye; for the above purpose they will answer very well, as I have proved. Whether an ordinary dense gelatine emulsion plate would answer as well I am not able to say; however, if anyone have a difficulty and wishes to obtain such a negative he can try this plan.

"F. S. K." suggests the possibility of the soluble portion of gelatine affecting its "keeping" property. I notice that from less than a drachm of wash-water a very large quantity of flocculent precipitate is thrown down by the tannin, which has a brown colour. "F. S. K." may be right; but I believe that no one has found his emulsion to more quickly decompose than Mr. Kennett—I mean that he is quite as much in the "wrong box" as the rest of us—yet Mr. Kennett does not "dialyse," but washes his pellicle.

I noticed, some time back, in the "Correspondence Column" a reference to a query of a correspondent who was going to try some of the vegetable colloid substances, such as "Iceland moss." Has he done so? If so, is it endowed with better keeping properties than the "animal" gelatine? It could, doubtless, be easily prepared in the same form as the gelatines.

In conclusion: I have just developed two of my plates and two by "Franklin's" formula. The afternoon was very dull, and at 3.30 p.m. the plates were exposed—lens $\frac{f}{30}$—for one minute, on a subject comprising masses of very dark foliage cutting against the sky, as well as red brick and white paint. Two of the plates were soaked five minutes in distilled water and developed together by "Franklin's" formula (carbonate). I should say that the plates were prepared together, and that my plates had an addition of one per cent. of chrome alum. "Franklin's" plate showed signs of development first; but, by continuing with the same developer, eventually mine caught it up, though the sky of "Franklin's" is denser—in fact, very dense—and, by reflected light, has a primrose colour,* which mine has also in a less degree. "Franklin's" is slightly fogged by continued action of the developer; mine is not. The slow developing action of my plate is

* I cannot say that I have tried this experiment, but I accept it as a matter of faith, believing that others more competent than myself have proved the case to stand as I have put it. I think this is Mr. Stillman's experience at least for one, and if I am wrong I shall be glad to be put right. I have no right, or wish either, to promulgate doubtful theories as facts. I only wish what I write to be as suggestive as possible; and if I should "hit the nail on the head," why, so much the better. When I have a *fact*, up will go the "notice-board!"

† It is possible that the "milkiness" may be caused by a loosening of a little of the, perhaps, not quite solidified gelatine, as I see that there is a hair-like line across the surface, caused by the wash-water.

‡ The addition of chrome alum, as suggested by me, does not prevent this blistering, unless, as is just possible, these parts are not as "anhydrous" as they should be to cause insolubility.

* In the plates developed with liquid ammonia the sky is *black* by reflected light.

to be accounted for by the chrome alum. I know that the plates will give great density.

The other two plates were developed by Kennett's formula, without any bromide. By accident my plate was exposed with its *back* to the lens; but this seems to have made no difference in the result except that it was put into the tray upside down, so that it must have been less wetted before the plain pyro. was poured on as well as afterwards, as I did not discover the mistake till some time after the ammonia had been added. As it was, "Franklin's" plate developed a fairly dense sky with pyro. alone, and soon showed all the detail that could be got. It then fogged badly; so much so as to give the back of the plate, after fixing, the appearance of not having been fixed—that is, by reflected light. My plate, if anything, *more* than caught it up, and is, moreover, free from fog. I may say that my plate developed with carbonate blistered, on washing, at one corner, as described; the plate developed with liquid ammonia did not. This, I think, goes to prove that the cause of this kind of blistering is not *decomposition;* the emulsion was the same lot as that by which some plates I have already mentioned were prepared, and was by no means new.

Now, my emulsion has several advantages, in my hands, over "Franklin's." Firstly: the plates can be more thinly coated, and are, even then, more opaque. Secondly: great immunity from "fog." Thirdly: no necessity for keeping the emulsion warm during making.

After my experience, and for the above reasons, "Franklin" will quite perceive my right to say of *my* process—"Try it." It would be just as well that some third person should adjudicate upon the merits of the "rivals," as this plan is always more satisfactory to outsiders.—I am, yours, &c., HERBERT B. BERKELEY.

Cotheridge Court, Worcester, April 24, 1876.

P.S.—I have just discovered a mistake in my last letter at page 179. In the top line of the first column "twenty-two" will be seen; *read* "about nineteen." This would leave an excess of silver equal to six grains per ounce—probably an unnecessary quantity. Also, pass the pen through "as in Mr. M. Carey Lea's process." Read, also, in the opposite column, line 17, "*nitrate* ON *silver*," not "nitrate or silver."—H. B. B.

THE PHOTOGRAPHIC PUZZLE.

To the EDITORS.

GENTLEMEN,—With regard to the "photographic puzzle," it has occurred to me that the solution may be found in the fact that in working with the electric spark it will frequently be seen to throw off sparks which consist of minute portions of the metal terminals, and should one of these pieces of metal highly charged with electricity—which I have no doubt they are—fall upon the collodion film at any part of the manipulation, I can quite understand a great reducing action may be set up.

Upon refering to Dr. Carpenter's work, *The Microscope and Its Revelations*, I find a diagram of the crystals of sulphate of copper with a small quantity of sulphate of magnesia gives exactly the same form and general character of the radiations as seen in the photograph under notice. With respect to the imperfection in the circle on the side towards the figure of the spectrum, there was an action set up by *light* which had a more powerful attraction for the silver surrounding it; so the accidental reduction had nothing to work upon in that direction and exerted all its powers on the other side.

I return herewith the print you sent me, with many thanks.—I am, yours, &c., G. H. MURRAY.

Guildford, April 23, 1876.

ANSWERS TO CORRESPONDENTS.

☞ *Correspondents should never write on both sides of the paper.*

WARD & CO.—Received. In our next.

W. H. W.—Your request will receive attention.

J. C. STENNING.—Thanks. We shall examine the formula attentively.

ALEXANDER HENDERSON (Montreal)—Post-office order received. Thanks.

EXCHANGES.—We have been obliged to postpone these notices till next week.

A. M.—By applying benzole the black varnish may be entirely cleaned off.

D. YOUNG.—Much better that the matter be allowed to remain *in statu quo.* We shall be much pleased to receive the promised description.

J. G. P.—It would certainly have done with less boiling, but you ought to have added a little water in order to make up for the evaporation.

X. Z.—By applying gentle heat the solution will yield crystals. These you may treat as if they had never been subjected to the influence of moisture.

R. D.—We used a portion of the pyrogallic acid which was enclosed, and found that it was a fair sample. An article on the subject of your letter is in course of preparation.

BOSS.—The apprentice may be summarily dismissed. The presence of a youth of that character would render the position of the other *employés* very unpleasant, if not absolutely unsafe.

A COUNTRY PHOTOGRAPHER.—The Photographic Society of Great Britain does not hold any out-door meeting during the summer; one such meeting is held by the South London Photographic Society.

MARY B.—Put a teaspoonful of the chloride of lime into a breakfast cup, then pour over it sufficient *hot* water to nearly fill the cup; allow it to stand for five minutes, then filter, and the liquid is ready for use.

A. H. W.—Mr. J. J. Atkinson, of Liverpool, is, so far as we can learn, the only dealer from whom such plates can be obtained. The more we have seen of them in connection with carbon printing the better we like them.

C. RENNISON.—From certain finger-marks on the back of the prints we have no difficulty in arriving at the conclusion that, previous to their being fixed, they have been handled by fingers contaminated with hyposulphite of soda.

B. J. T.—Geymet and Alker, of Paris, published, about six years ago, a treatise on the production of vitro-enamel photographs. We are not aware of any one keeping this work for sale in this country, but it can, doubtless, be obtained from the firm named.

SUBSCRIBER (Calcutta).—1. Your old tutor has been dead for several years. He died at Potter's Bar, after a very brief illness brought on by running to catch a train.—2. Marine glue will answer much better for your purpose than shellac, being more adhesive and tough than lac.

GEORGE SMITH.—Try the preparation of sensitive negative paper by the old and well-nigh forgotten waxed-paper process, introducing a rather larger proportion of bromide than was given in the formulæ of former times, and using pyrogallic acid, instead of gallic acid, as the developer.

J. R. ROSS.—The prints are excellent, with one exception—they are all very much over-toned. It is to this cause that the cold, slaty, blue tone is assignable. By removing them from the toning bath at a much earlier stage of the operation you will obtain the warm violet tones you admire so much.

T. P. (Bristol)—1. The lens has been thoroughly examined; the result will be communicated by private letter.—2. Do not wait to be "persuaded" with respect to the value of the carbon process as applied to opalotypes, but give it a fair trial. You will be sure to like it. The process answers well for ivory.

HECTOR.—The camera was ingenious, but we do not think that over half-a-dozen, even if so many, were ever made. When a photographer works wet plates in the field he prefers to see what he is about, and to this end he obtains the assistance of a tent or developing-box. With the camera alluded to by far too much was left to guess-work.

X. Y. Z.—The moral to be deduced from the squabble now so happily terminated is that by acting "fair, square, and above-board," one will always eventually fall upon his feet. Although deeply interesting to you and your immediate circle of friends, the matter possesses too little general interest for our readers to warrant us in publishing it. We thank you, however, for the details.

A. W. E.—Any good ordinary commercial sample of sulphuric acid will answer quite well, but the stronger the acid is the better. Sulphuric acid has a great affinity for water, hence its desiccating property. Chloride of calcium will also effect the desired end. If you afford us any information concerning the precise process for which the desiccation is required we may be able to give a hint by which the matter might be simplified.

SIGMA inquires if it be not possible to construct a photographic lens in which the refractive power of any clear fluid, such as water, may be utilised by enclosing it between hollow shells of glass.——Lenses of this kind *have* been constructed, and have even formed the subjects of patents; but it was found that glass answered every purpose in such an effective manner as to have led to the discontinuance of the production of fluid lenses, which are now only to be found in the cabinets of the photographic archæologist. If our correspondent be at all curious to inspect such lenses, we shall be glad to show him some of the finest specimens existing.

ONE IN DOUBT.—Not only would no fault be found with you, but you would be highly esteemed by every right-thinking person, and be very much thanked by artists, for having contributed such a valuable addition to the sources from which are to be obtained the most perfect examples of the human *physique.* Venuses and Apollos are not met with every day; and the best of them result from a species of "natural selection," or rather artistic selection of parts—a kind of patchwork, so to speak, in which an arm is borrowed from one model, a head from a second, a bust from a third, and the posterior limbs from a fourth. There is something in the expression of your Venus that we do not quite admire; but, by tuition, that may easily be overcome, and she may be made to look the part she is physically so well adapted for assuming.

SAM. FOWLER.—The formula for collodio-chloride first published has been discontinued long since, and modified variations adopted instead. The following is one that has been recommended for printing on opal glass:—

No. 1.	Nitrate of silver	1 drachm.
	Water	1 ,,
No. 2.	Chloride of calcium	64 grains.
	Alcohol	2 ounces.
No. 3.	Citric acid	64 grains.
	Alcohol	2 ounces.

To every two ounces of plain collodion add thirty drops of No. 1 solution previously mixed with one drachm of alcohol; then one drachm of No. 2 solution gradually, shaking well at the same time; lastly, half-a-drachm of No. 3 solution. It is fit for use after being allowed to stand for a few minutes.

RECEIVED, too late for attention this week.—H. J. Newton (New York); J. D. L. (Douglas); C. H. T. (Blandford), A. M'D. (Dundee); W. B. Bolton.

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THE BRITISH JOURNAL OF PHOTOGRAPHY.

No. 835. Vol. XXIII.—MAY 5, 1876.

A NEW METHOD OF TRANSFERRING, REVERSING, AND TRANSPORTING NEGATIVES.

We have been shown by Mr. Walter Paul various results of a method of transferring a number of negative films to one plate. This forms a *multum-in-parvo* negative, and the method will prove exceedingly useful for many purposes. Previous to indicating these purposes, however, we shall give a description of the process itself.

The only appliances required not usually found in every studio are a few sheets of plain gelatinised paper; that is to say, plain paper which has been drawn over the surface of liquefied gelatine in a dish, and which has then been hung up to dry. For various purposes in photography the gelatine which is applied to the surface of paper is rendered insoluble by the admixture with it of chrome alum or by subsequent treatment either with tannin or alum; the paper required for *this* process is a simple gelatinised one, the condition of the gelatine not having to be altered in any way. Any paper will do, but fine Rive or Saxe paper is most to be recommended. The strength of the gelatine is one ounce to a pint of water.

A piece of the transfer-paper, having been previously wetted in cold water, is laid carefully down upon the collodionised surface of the negative, which must just previously have been also made wet with water. The paper is pressed in contact with the negative by means of a squeegee, and allowed to remain until perfectly dry. It is important to notice that the drying must be spontaneous, no heat being applied to aid the operation. When this has been effected any trimming that may be deemed necessary can now be done, or, if preferred, this may be deferred until after the transference of the film.

To remove the film all that is necessary is to sponge the back of the paper with cold water, taking care that every portion is moistened. After the lapse of one or two minutes the paper is lifted by one corner and peeled off the glass—an operation effected with surprising facility. The collodion film is now found attached to the paper, to which it closely adheres.

In this state it forms an excellent reversed paper negative, and, as the whole of the detail is embedded in the collodion, no falling off of the sharpness can possibly take place. To expedite the printing the paper may now be rendered translucent by waxing, varnishing, or by the adoption of any of the means so well known for effecting such purpose.

The transferring of the film to a glass plate is effected in the following manner:—The glass, having been previously coated with a solution of gelatine of about one ounce to sixty ounces of water, to which has been added a little chrome alum, and this substratum having been allowed to become dry, is placed in a vessel of water; when lifted out it is placed in a tolerably level position. The negative on its paper support is now made wet, and then carefully laid down upon the glass, care being taken that there are no air-bubbles allowed to remain between the collodion and the glass. The services of the squeegee are had recourse to again, and the whole allowed to become dry, which at this stage is by no means a tedious affair, about thirty to forty minutes being sufficient. It is then placed in *warm* water, by which the paper support is immediately brought away, leaving the collodion film securely attached to the glass plate.

The negative is now in an admirable condition for being worked upon by the retoucher, as sufficient of the gelatine still remains to give a fine tooth for the pencil and to afford complete protection to the silver image. After this the negative is varnished in the ordinary way.

As one great use of this process is the placing of several subjects upon one plate of glass, it follows that judgment must be employed in the placing or "laying down" of each subject. In cases which involve a large number of prints of one subject a number of negatives can be placed side by side and at the requisite distance apart, so as to allow of easy trimming and the avoidance of any waste of paper in printing.

To produce a reversed negative on glass it is requisite to apply a thin solution of india-rubber in benzole to the collodion side of the sheet of paper bearing the pellicular negative, and then to press this in contact with a second sheet of paper also coated with rubber solution—in fact, just mounting the picture face downwards, and by means of india-rubber paste, upon a sheet of paper. This compound sheet is now placed in warm water, when the gelatine paper immediately comes away, leaving the collodion attached to the sheet last applied by the india-rubber solution. The picture is then laid, again face downwards, upon a clean plate of glass, pressed in intimate contact with it without any previous preparation being applied, and the whole allowed to remain till dry, when the paper may be stripped away, leaving a clean negative upon the glass. Should the india-rubber paste hold too tenaciously it may be prudent to sponge the back of the paper with benzole, by which its hold will immediately become loosened. This, however, will rarely, if ever, be found necessary.

A use for this process, and one which we think cannot be too highly appreciated, is the facility it affords for the transport of negatives. For example: it is found desirable to send a dozen negatives from one locality to another between which the only convenient mode of communication is by post. By means of Mr. Paul's process such transport can be effected with singular ease and certainty. All that is requisite is to transfer the negative to the gelatine paper in the manner described, roll it up, and send it by post to its destination. The recipient of the negative would then carry into effect the subsequent stages of the process, which, we need scarcely say, could be as easily done in London as in Australia or India—the countries in which we may suppose the negatives have been taken.

Again: who does not know to his painful experience the cost and annoyance involved in the storing away of large negatives upon glass—negatives which may never have occasion to be again utilised as such by the owner, and yet with which he would not willingly part? To meet such a case Mr. Paul's process becomes exceedingly useful. To compare one thing with another, it is similar to the convenience afforded to the typographic printer by the adoption of the French method of stereotyping, by means of which valuable type, or even stereotype plates, need not be kept "standing" or in stock in the expectation of a remote future demand for their services in reprinting any work, seeing that a faithful cast may be taken in plastic material not much thicker than pasteboard, from which at any convenient time a metallic counterpart can be obtained. But

Mr. Paul's method of transfer does rather more than this; for, as we have said, the negative may be utilised for printing even while it still remains attached to its paper support, and this without any loss of sharpness.

To conclude: for the condensation or grouping of a number of negatives upon one plate, for the reversing of a negative, for its utilisation in either a direct or reversed form both upon paper and upon glass, and, lastly, for facility of transport of negatives as well as for their storage, the process now described possesses features of incalculable value.

AN IMPROVED METHOD OF PRINTING ON WOOD BLOCKS.

Notwithstanding the strong hold that photography has taken on the public mind, and the varied uses to which it is now applied both artistically and commercially, there are still many purposes for which it is admirably suited but to aid which it has not yet been applied, and many for which it is not by any means so largely utilised as it should be. Of the latter class we think the preparation of wood blocks for the engraver is a striking example, and our object in this article is to urge its importance in this department of art, and point out what we think some improvements on previous methods. We are, of course, aware that already considerable attention has been given to the subject, and that, in the metropolis at least, certain photographers make a *specialité* of that kind of work; but we believe that engravers have not yet availed themselves of it to anything like the extent its inherent advantages would lead us to expect. In too many cases—so careless have provincial photographers been of the benefits which would accrue from practising this method—it is within our knowledge that many engravers throughout the country are in the habit of sending to London to get such work accomplished.

Probably one reason why photographers generally have so neglected what should be a lucrative branch of professional business is to be found in the fact that most of the methods hitherto recommended appear somewhat complicated; and as photographers are slow to move out of the beaten track, while engravers are not sufficiently alive to their own interests to press the matter upon their attention, they have rested content with the knowledge that it was practicable, but not worth the trouble of pushing. It must be confessed, also, that the engraver does not at first "take kindly" to the photographic image, at least when it has been printed from a negative in half-tone. His previous practice has only brought him into contact with objects in line, and, like the photographer, he is possessed of rather strong conservative tendencies; but a little practice soon solves the apparent difficulty, and a skilled hand can very soon engrave as well from the one kind of image as from the other. Of course this seeming objection does not apply to the case of drawings, which, by the aid of the camera, may in a few minutes be enlarged or reduced to any required scale, and printed on the block at less than a tenth of the cost involved in drawing by hand, and that, too, combined with all the advantage which absolute accuracy possesses. It is, however, in direct photography that the system shows to the greatest advantage, as a negative of even the most complex piece of machinery may be taken in a few minutes, and transferred to the block in little more time than it takes to write about it—minute it may be, but full detail, and infinitely superior to anything that can be done by the hand.

We have before us, while we write, a block on which is a drawing of a recently-patented printing-press, on a scale of a quarter of an inch to the foot, and perfect in every detail. The time occupied in its production—inclusive of ten minutes in the printing-frame—from the setting up of the camera till it was ready to be put into the hands of the engraver was thirty-eight minutes.

The objections which the wood engraver makes to photographic transfers, in addition to that already mentioned, are mainly two, namely, that the film generally left on the surface is difficult to cut through, and that the necessary washing and moistening interferes with the grain, and causes it to cut rotten. The latter objection has, we think, been much exaggerated, especially where, as in the process about to be described, the washing has been reduced to a minimum; while the former is altogether obviated, the only film being one of exceedingly thin collodion, and even that may, if desired, be altogether dissolved away.

The negative is, of course, taken in the usual way, but as it must be reversed on the block it should be taken through the glass; that is, the film side should be next the door of the slide, the thickness of the glass allowed for in focussing, and the spring of the slide kept from the film in any of the well-known modes. To prepare the block, dissolve five grains of chloride of barium in about half-a-drachm of water, and with that moisten about half-a-drachm of sulphate of barium. This is then gently rubbed over the surface of the block—first with the finger and then with the ball of the thumb, so as to produce an even, thin coating, which result is easily obtained after a little practice. A coating just sufficient to whiten the surface will be found enough. Or the two salts of barium, in very fine powder, may be intimately mixed, and, by a circular motion of the finger, applied to the block, when sufficient will be found to have adhered to answer the purpose. The barium chloride is converted into silver chloride, and the surface rendered sensitive as follows:—Six grains of pyroxyline is dissolved in half-an-ounce of ether and two drachms of alcohol; then twenty grains of silver nitrate is dissolved by heat in two drachms more of alcohol and added. This should stand till clear, and will keep well if light be excluded. The silvered collodion is poured on and off the block in the ordinary way, and may be dried either spontaneously or by artificial heat. In consequence of the rigidity of the block the progress of printing cannot be examined in the usual way; but with a moderate amount of practice there is little difficulty in hitting the proper time without examination. By a method we have lately adopted the progress may be examined from time to time, and the block returned to its proper place with ease and certainty.

The most convenient printing-frame we find to be similar in construction to those in ordinary use, with screws instead of springs. It has only one bar, which is placed in the centre, and one screw in the centre of the bar, and no back is required. Some pieces of wood like printers' "furniture" are also required. We use toy bricks. The negative is placed in the centre of the frame, and the "furniture" is laid along one end and one side in such quantity that the block is in proper position when two of its sides are pressed rigidly against it. The bar is then shut down and the screw tightened to give the required pressure, when the whole is ready for exposure. In this way there is no difficulty in examining the block as often as may be necessary, perfect registration being secured by seeing that it is always pressed into the corner formed by the "furniture."

The printing should not be deeper than the finished image is intended to be, as it does not seem to lose anything in the fixing, but rather appears to get a little deeper. On removal from the frame the surface of the block should be brought into contact with a solution of hyposulphite of soda in a flat dish, and moved about on the surface for a few minutes, when it will be found sufficiently fixed, requiring only to be washed with a gentle stream of water and set up to dry. Or if it be desirable to get rid of the thin film of collodion, it may easily be dissolved off by a mixture of ether and alcohol before the application of the fixing solution.

This description, like many that have gone before, may appear complicated and troublesome; but the method is exceedingly simple and certain, and the results are in every way satisfactory. We heartily commend it to the attention of those who have an hour or two to spare; and in these times of dull trade, if all we hear be true, there are too many with that undesirable qualification. We are certain that, if it were properly brought before wood engravers generally, photography would soon supersede hand drawing to a much larger extent than it has hitherto done, very much to the pecuniary benefit of both parties.

ON THE EXTEMPORISING OF WIDE-ANGLE LENSES.

Lenses that include a large amount of subject are not only at times convenient, but absolutely necessary. By means of a wide-angle lens numerous pictures and views of buildings can thus be obtained.

which without such an instrument it would be impossible to secure. It is probably owing to the introduction of wide-angle lenses that panoramic cameras have now, to such a large extent, fallen into disuse; for when by means of the ordinary camera a well-defined picture including an angle of ninety degrees can be secured, any desire to obtain a few degrees more by means of a pantascopic camera which rotates by clockwork becomes very much weakened.

We have too frequently spoken of the bad taste of employing a wide-angle lens on all and every occasion to render it necessary that we should here revert to the subject, for it will be found that pictures embracing a rather narrow angle of view are the most pleasing; still, as occasions frequently arise in which it becomes necessary to increase this angle, and under circumstances which render it inexpedient for the photographer to purchase a new lens for the purpose, we propose giving such directions, founded upon a series of experiments we have just terminated, as will enable artists, without incurring much expense, to add very considerably to the capabilities of certain of their lenses.

Herr Steinheil, by making the discovery of the immense power conferred upon lenses of a particular description by constructing them altogether of flint glass of two ratios of density, instead of the flint and crown glass of which they had previously been formed, planted seeds in connection with the photographic branch of optical science which have borne fruit in great abundance. He and others found that perfect aplanatism could be obtained by means of two corrected meniscus lenses mounted hollow sides next each other, and separated a certain distance apart. By constructing the lenses of two kinds of flint glass, and correcting them internally in the particular mode which formed the subject of Mr. Grubb's patent for his "aplanatic" lens, it was found that cemented combinations of lenses could be obtained having such a large aperture as to admit a volume of light of sufficient intensity to work with a much greater degree of rapidity than had ever before been experienced. Lenses in which this principle is thoroughly recognised are now made by several continental and at least four manufacturing London opticians, "rapidity" of action being the speciality claimed on their behalf; for it is well known that the usual landscape and wide-angle lenses are necessarily slow, on account of the small size of the diaphragm which *must* be employed when a large angular extent of subject has to be included.

The "rapid" series of cemented doublets, whether made by any of the four London manufacturing firms or by the Munich opticians, are now in extensive use, and there is no doubt that this is one of the most useful lenses that has yet been constructed. Working with an aperture of $\frac{f}{7}$, it is evident that in a fair light portraits can be very successfully taken without any stop; and it is a well-recognised fact that, when a diaphragm is used, the area of sharp delineation may with the same lens be extended to sixty degrees—a quantity recognised by artists as ample.

Still the artistic angle of sixty degrees falls far short of that recognised as "wide," and we shall now show in what way a combination lens of the genus "aplanatic" can be easily converted into one of a very large angle.

Flatness of field, with a large aperture, can only be obtained when the two lenses are separated some distance from each other. Now, the long tube which enables these conditions to be secured effectually prevents the transmission of an oblique ray, and hence the included angle of view is much limited. But we have found that when the lenses of these "rapid" combinations are suitably mounted they may be made to form a new objective possessing distinctive features. One advantage of employing flint glass alone, instead of the usual flint and crown, is that deep external curvatures may be employed in the formation of the lenses; the denser the material of which the glass is composed the more "pronounced" may be the meniscus form of each of the two achromatic lenses of which the combination is formed. In this lies the secret of large covering power co-existent with large aperture—definition being presupposed. But the deeper the external curvature of two menisci forming a combination the more favourable are the conditions under which a very oblique ray may be transmitted. It is, therefore, only necessary that the distance between the lenses of the "rapid" genus be greatly diminished, in order to convert such a combination into a wide-angle objective, a small stop being inserted between the lenses.

Let us see how this applies in practice. We possess a 5×4 lens of the description of which we have spoken; the figures here given are engraved on the tube. Its equivalent focus is six inches; this we know both from actual measurement and from the catalogue of its maker. The distance at which the lenses are mounted apart is one inch, measuring from the inner surfaces. But we have a supplementary or additional mount of about half the length of the original one, into which we screw these lenses, and in this latter mount they are at once converted into a most admirable wide-angle objective covering a plate ten inches by eight inches most admirably—a small diaphragm being used, of course. In this altered condition there is not the slightest distortion, the marginal lines being absolutely straight.

We were aware, theoretically, that lenses of this character should cover a very much larger field than their makers—who are not necessarily practically acquainted with photography—appeared to imagine; but until we had recently put theory into practice we could not have supposed that they would do so with the perfection they have done. Having handed our 5×4 lens, thus altered, to a professional photographer for the purpose of covering a 10×8 plate, he has returned it with the remark that he believes it would cover a plate 12×10 quite sharp to the edges.

An extra mount half, or less than half, of the length of the original will only cost a trifling sum. The photographer who makes this investment may accept our assurance that by so doing he will secure an immense accession of power. What we said refers to not the "wide-angle" class of lenses, but to those to which we have referred as lenses of the "rapid" kind, which are now being extensively made and introduced under a variety of names, the lenses themselves being alike or nearly similar.

ALKALINE DEVELOPMENT.

Alkaline development is once more attracting notice, and, I think, not without reason. We have fallen sadly too much into the habit of regarding that mode as a mere "rule-of-thumb" matter—so many drops of liquor ammonia added to so many drachms of three-grain pyro. solution—without giving the slightest attention to the very variable conditions under which different pictures are taken. Those who are in the habit of working wet plates either in the studio or in the field know very well that, in order to produce the best results, the proportions of iron and acid in the developer have to be altered to suit not only different subjects and different exposures, but also the various conditions of temperature and light. With alkaline pyro., however, it is generally accepted that much greater latitude is permissible, and that if the first developer happen to be not exactly suitable it may be modified to suit the precise requirements of the particular plate under treatment without interfering in the slightest degree with the quality of the result.

Recent opinion, however, is veering round to the belief that such is not the case, but that a particular development is necessary with each different form of plate. It was formerly believed by the leading dry-plate workers that the density and printing qualities of the negative depended upon the strength of the pyrogallic solution employed and that if the requisite quantity were not used at the commencement of the operation no subsequent additions would make up for the deficiency in the result. A later system was based upon the application to the film at the outset of the development of a solution strong not only in pyro., but also in alkali and restraining bromide—the two latter in much greater proportion than had ever previously been used. Each of these methods may be, and no doubt is, well adapted to its purpose under certain circumstances; but to lay down a hard and fast line as to what style of development is most suitable to every class of plate is, I think, an impossibility.

The exact conditions under which certain results are produced cannot, perhaps, be recorded with absolute certainty; but I propose to give briefly the conclusions I have arrived at after devoting very considerable attention to the subject. The modifications in the method of development may be classed under various headings, of which the principle are—variations in the quantity of pyro. and of alkali used at the outset; quantity of bromide; relative proportions of pyro. and alkali; subsequent additions of pyro. and alkali. Some

descriptions of plates require a tolerably-strong pyro. solution to start with and but little alkali; others are better for a reversal of that order of things; while a third requires that both pyro. and alkali shall be in large proportion. The quantity of bromide used depends generally upon the alkali, though there are cases where it is quite unnecessary. Again: in the matter of subsequent additions to the developer, with some plates the image advances rapidly to full density by the mere addition of a very small quantity of alkali without any pyro.; with others it is necessary to add the alkali in repeated doses and in considerable quantity; while others, again, require both alkali and pyro. in variable proportions.

The first class of plates I shall notice includes emulsion plates prepared with excess of bromide and bromo-iodised bath plates. These, as a rule, develope best with a three-grain solution of pyro. and a very small proportion of alkali, acquiring density rapidly with very little further addition of alkali. These are the plates which were in most general use when the alkaline mode of development was in its infancy, and the formula which was then recommended as best appears to have been clung to very tenaciously ever since.

Bromised plates prepared with the bath require very similar treatment, only the alkali must be stronger and in repeated doses. When we come to the more rapid forms of emulsions—those prepared with considerable excess of silver—the treatment is very materially changed, as a feeble image without intensifying power is the only result of a feeble developer. With such plates it becomes necessary to employ a very much larger proportion of alkali and a corresponding quantity of restraining bromide without any great increase in the pyro.; with such a solution the image appears at once with great vigour and clearness, and intensification proceeds rapidly. Were such a developer used with some forms of collodio-bromide plates the result would be the exact reverse—a dull, flat picture with no apparent capability for acquiring density. Indeed, the same form of developer, whether weak or strong, will produce very opposite results according to the character of the plate.

Washed emulsion plates are rather peculiar in their behaviour; for, while they develope satisfactorily in the first stage of the operation, they frequently require a large amount of coaxing to induce them to take density. I have found the best plan to be the following:—A solution of pyro. of medium strength, not more than two grains to the ounce, while the alkali depends greatly upon the excess of bromide or of silver (as the case may be) used in the preparation of the emulsion, increasing the quantity in proportion to the silver employed. This is for the first development; for intensifying I add gradually fresh portions of *both alkali and pyro.* when the density is gained with great ease. The more sensitive the plate—that is, the greater the excess of silver used in the emulsion—the larger the quantity of alkali used at each addition, though the pyro. need not be altered. Should the intensification lag, the use of a fresh solution containing a large quantity of alkali will in nearly all cases make it right.

These remarks of course refer to plates which have received a correct exposure, and form the standard rules, which may be varied to suit different circumstances of light and exposure. Much of the ease in intensification, I believe, depends upon the employment of the right development to commence with; for, though in some cases the first image may be extremely thin and delicate, if properly treated it will be found to acquire density without trouble.

In conclusion: I may say, with reference to the alkali, I employ both liquor ammonia and the carbonate, as suggested by "Franklin" in the number for April 21. The former is the more powerful, but requires very great care in using it in quantities; hence I prefer the carbonate for the purposes of intensification. By its means I am able to obtain density where the hydrate has completely failed, as it may be applied to the plate (when necessary) in the saturated state without danger of destroying the image, if a due proportion of bromide be used with it.

W. B. Bolton.

GELATINO-BROMIDE EXPERIMENTS.

Summer is now drawing near, and with its advent many amateurs, who during the winter months can only occupy their spare time and cameras with experimenting, will be turning their thoughts to more profitable *fields* of investigation. For this reason it is "now or never" with all processes undergoing their term of probation, including the gelatino-bromide process in its improved form. This being the case, I feel that an apology is less due than would otherwise have been the case in bringing before your readers a few additional remarks respecting "Franklin's" and my own modification of the gelatino-bromide process.

I can speak very highly of "Franklin's" process. I know that it will give exceedingly fine results. Those who can carry in their "mind's eye" the appearance of, or possess, the old "Liverpool" emulsion negatives will very nearly realise the effect of these gelatine negatives, except that the latter retain the usual capacity for weak radiations characteristic of the *old* form of gelatine emulsion. I remember that the old Liverpool plates—especially if developed with a weakly-alkaline developer—inclined to claret colour in the high lights, or at least to a rich brown. This is often the colour of the modern Liverpool negatives.

I think it will be rather surprising to those who are accustomed to the often grey, though sometimes olive, colour of the old form of gelatine plate to develope one with a sky and high lights as intensely vermilion coloured as can well be conceived; nevertheless, I found this to be the case when developing one of "Franklin's" plates with his formula, the exposure being ten seconds, with $\frac{f}{16}$ wide-angle doublet. If the development had been continued probably a rich brown would have been the result. The kind of developer greatly affects the colour; the above developer gives a negative with a "bloom." Ammoniac hydrate, as I have remarked, gives, in my hands, a blackish negative, without bloom; the shadows appear clear by reflected light. I have, also, tried what I have labelled "Davanne's alkali." This, when first made, seemed to have a property of very quickly oxidising the pyro. without a corresponding vigorous reducing effect on the exposed plate; after standing a few days this first defect seems to be partly remedied. I cannot say that I have had much experience with this alkali, but, before recounting what I have had, I will add this to the above remarks on colour—"Davanne's alkali" seems to conduce to a colour somewhere between that resulting from ammoniac carbonate and hydrate respectively.

I have exposed four plates today—two of "Franklin's" and two of my own—for three minutes each with $\frac{f}{16}$ wide-angle doublet, subject fairly lighted, but sky rather dull and showery, at one p.m. This is the best idea I can give of the lighting. One of each kind of plate was developed by "Franklin's" developer, *minus* any bromide. The "Franklin" plate soon developed to a very good negative of a rich brown colour, while my plate was slow in developing, and did not reach the intensity of the other, though much the same quantity of detail appeared to be there, if it had only come out. This does not look well for my formula, but I do not despair, because my plate contains chrome alum, and, also, because of my former experience and of the fact that the next two plates "trod on each other's heels." The colour of the image of my plate is, perhaps, a little less warm.

The two remaining plates were developed by the following formula, also without bromide:—

Pyro (in alcohol)	3 grains.
Davanne's alkali	10 drops.

Ten drops more of the latter were subsequently added, but reduction of pyro. was then very rapid. Neither of these plates has the same density or warmth and, perhaps, not the desired detail, unless not sufficiently intensified, that the carbonate plates have; however, there is very little to choose between my plate and "Franklin's," but the latter is the denser. Here, again, I am inclined to attribute the inferiority of my plate to the impermeability of the film, caused by the chrome alum; for I know that thinness is a result of its use. I shall not add it to my next emulsion, which I hope will at least equal "Franklin's."

My experience, as yet, is not very favourable as regards "Davanne's alkali"—that is, applied to these gelatine plates. I am sorry for this, as, if the sugar of lime does not decompose, great certainty of the composition of the developer would result, as, also, so many drops of saturated solution would be used instead of the ever-varying solutions and dilutions of ammonia. If plates developed respectively by this alkali and ammoniac carbonate be placed together, either side up, on the table, the former will be black and the latter of a yellow-ochre colour. I cannot account for this difference* in the action of each; but, I suppose, some molecular change must take place in the arrangement of the reduced silver. However, as the silver is in position before reducing, this seems to me difficult to realise.

Towards the end of my previous communication I mentioned that my plate developed with carbonate blistered, but that developed by hydrate did not. I have had the same experience again today—the "Franklin" plate blistering in washing after developing, and my plate starting a blister from a point where the film had been accidentally injured during development. The two plates developed by "Davanne's alkali" remain with perfectly-tight films. Now, all these plates were prepared together, and one plate appeared no more

* This "ochre" effect is also to be seen in the plate referred to in my last communication, and developed with ammoniac hydrate—the fogged "Franklin" plate.

likely to blister than another—decomposition, therefore, cannot be the cause. This experience reminds me of that of "Franklin's" friend, who discarded carbonate for somewhat of the above reason; nevertheless, I am bound to own that carbonate does not always cause blisters, and, equally, that hydrate does not always result in immunity from them.

In conclusion: let no one look askance at "silver in excess" in gelatine emulsion, as used to be the case with collodion. I am convinced that this is *the* gelatine process *par excellence;* and no trouble, "fogging," or "thinness" will be experienced—in fact, the opposite of these are nearer the truth. HERBERT B. BERKELEY.

NOTES ON PASSING EVENTS.

By a Peripatetic Photographer.

WOULD the "Parent" Society be more or less held in estimation by the public if, instead of allowing itself to be made the medium for "airing" entirely new methods of photography—which, although "new," are valueless—it were to present as an occasional monthly repast a report of some of the novelties brought before the photographic world during the two or three weeks preceding? I believe that it would conduce much to the value of its meetings if this were recognised as a feature in its monthly proceedings, and if members were encouraged, or even invited, to bring forward notices of current novelties. It has missed this chance in connection with Lea's new colloidal restrainer; for, as the apathy of the old Society is not shared by the smaller body—the South London Photographic Society—the subject referred to has been submitted to the notice of that body by one of its members, and has thus had its value attested by practical photographers under circumstances which permitted of *vivâ voce* explanations or suggestions of difficulties. The value of this method of introducing subjects to the recognition of photographers in a practical manner is great, and ought to be made a feature at the monthly gatherings of the fraternity.

While it is very gratifying to find that the more inventive among the denizens of the spirit world are condescending to impart sound items of information to us poor mortals—who certainly need it very badly—there are two sides to the way in which such information can be viewed in connection with proprietary rights. In *Notes from the North* we are told by Dr. Nicol that a certain piece of apparatus for the production of the lime-light was new, that "it was the invention of Mr. Birrell," that it has been patented by that gentleman, but that he is really not the real inventor, as he has received the information from Priestley, Newton, or somebody else who has "gone before." Of course the narrator of the fact or, rather, alleged fact is absolved from any endorsement of it; and this the more readily inasmuch as it is a matter that has been well known to many others "lang syne"—anticipating the publication of the *Notes* in question by many a day. Will Mr. Birrell, Dr. Nicol, and such spiritualists as may read these lines, bear with me while I talk to them for a few minutes? I commence by asking—By what right has Mr. Birrell sought to obtain a patent for this invention? It was either his own invention or it was not. If it be his own, why does he say that he "takes no credit to himself" for it, as it is, presumably, a communication to him from——well, from some other source? Phrase and fact do not, on this hypothesis, quite coincide. But if it be really true—and far be it from me to doubt it—that the invention was a communication to him from some unseen or, at any rate, immaterial intelligence, then, I ask—What legal right had he to patent the invention? The words of the "declaration" which must be sworn to before a magistrate on making application for a patent for any invention are that the applicant "is the true and first inventor thereof." Again, in the "petition" to the Queen the same language is used, and on the faith of this declaration being correct the patent is granted. But how could an applicant swear that *he* is the "true and first inventor" of a thing that was revealed to him by some one else? There is thus raised a slight difficulty. Waiving altogether the moral right of a man patenting as his own an invention received, or alleged to have been received, from another—especially a denizen of the spirit world—I look at the matter just now only in its legal aspects, and I indulge in a feeling of wonder how a case of infringement would stand if brought before a court of equity. Just imagine what a sharp counsel, well versed in patent law, would say as against the patentee, and imagine what the remark of the presiding judge would be if the patentee were to aver that he received the invention as a communication from, say, Priestley! "Why, then, did you not state in your specification that it was a communication from Priestley, residing —— where?" I forbear following up this theme, but, having Mr. Birrell's patent before me while I write this note, I am in a position to say that he has omitted the formality of stating the "*fact*," if you like, that it is not a communication from some one *not* resident within the three kingdoms. It ought to be a very pretty question for patent lawyers; but, for my own part, I pass on to something of more interest to photographers.

If gelatine emulsion do not soon assert itself as a very formidable opponent of collodion it will not be the fault of such intelligent writers as Mr. King, Mr. Berkeley, and "Franklin." The exceeding sensitiveness capable of being obtained by gelatino-bromide is now a subject involving a "puzzle." Can it be that a very small excess of free silver is sufficient to account for it? If this secret be once fairly mastered, then, alas! for the hitherto strong claims of collodion!

The "note" sounded to amateur beginners by "Fritz" is far more of a practical than of a philosophical character. It amounts to this—do not prepare your plates yourself, but purchase them ready to hand. This is about the worst advice that could be tendered to a *beginner;* for, if he is to feed continually on spoon-meat he will find, to a dead certainty, that his own development will be slow indeed. Purchased plates are all well enough in their way; but all beginners should commence by learning so much of the rudiments of photography as will enable them to prepare their own plates, and, having once acquired that power, *then* plates may be purchased whenever the erst beginner finds himself short or imagines that purchased plates will be superior to those of his own preparation. To purchase one's plates at the commencement of a photographic career may be a royal road to the production of a photograph, but it will not conduce to the practical education of a photographer.

With respect to the transmission of collodion or ether to India, I wonder very much that gutta-percha bottles, or vessels formed of any similar tough material, are not used for such purpose. Ebonite bottles would probably answer well. It is true I have heard that collodion exercises a slightly solvent action upon the latter material, but I think the statement incorrect. At any rate, one sample of ebonite I have had in a bottle of ether for many days does not appear to have undergone any change.

I lately heard a faint rumour that Mr. Stillman—who, as many of your readers are aware, is the special correspondent of *The Times* at the seat of war in the Herzegovina—had been wounded by a stray bullet from one or other of the belligerent parties among whom he has so long sojourned. I rejoice to say that this rumour is unfounded, for a friend of mine met him the other day in London, where he had just arrived on a visit, and he was then well and hearty.

This is the time of year when dry processes are in the ascendant. In the eager rush after new processes there is just a slight fear that many of the old and tried ones may be overlooked. Circumstances induced me to prepare three plates by the tannin process during the past month, and I was somewhat surprised at the exquisite gradation I obtained. Nor did I find that they required an exposure any longer than I would have given to average emulsion plates. They were prepared with a very strongly-bromised collodion, sensitised in a fifty-grain bath, and developed by the alkaline method. The exposure required was not more than twice that which would be given to a wet collodion plate.

While on the subject of dry plates I wish to observe that those who try gelatine instead of collodion must bear in mind that the former substance possesses greater powers of absorption than the latter; and hence when any solution has been applied which has quite permeated the gelatine a more thorough washing is necessary in order to get rid of such solution than would be required in the case of a thin collodion film.

OUR CHEMICALS.

No. II.

ALTHOUGH printing baths made of forty or fifty grains to the ounce of water are considered sufficiently strong for the majority of albumenised papers now in the market, the use of a stronger solution—say sixty or seventy grains to the ounce—with or without nitrate of soda, will be found to ensure more even and better tones than the weaker baths. The extra expense entailed is very trifling if proper means be taken to collect the residues, of which over seventy per cent. of metals used should be recovered. Chloride of silver is seldom required (except as residues), otherwise than conjointly with other materials, as collodion, gelatine, and albumen, and in which menstrua it is formed by the addition of soluble chlorides with a solution of the nitrate. When it is required it may be formed by

precipitating solutions of the nitrate with hydrochloric acid or kitchen salt, and by washing and drying the white, curdy precipitate thus obtained, which contains a little less than two-thirds of its weight of metallic silver—a fact to be borne in mind in estimating the value of residues. In collecting and recovering the metals from waste solutions it is advisable to keep certain kinds of solutions by themselves—all liquids containing nitrate of silver, as old baths, washing waters, &c., in one vessel; hypo. solution and solution from the developing sink in another; and toning baths and filters containing gold by themselves, and collect the precipitates from each separately. This renders the estimated value of the residues before reduction more easily ascertained.

Iron.

Preparations of this metal constitute the active ingredients of one class of our developers, and are of much importance in photography, consisting of the protosulphate, sulphate with ammonia, perchlorate, carbonate, and citrate.

Protosulphate of Iron occurs in commerce in three forms. One is in crystals of a clear bluish-green, free from opacity, or oxide. Many samples having this appearance are unsuitable for photographers' use on account of having been crystallised from very acid solutions, the crystals retaining an amount of sulphuric acid which, although improving the appearance of the salt, considerably deteriorates its photographic qualities. Another variety occurs in crystals not quite so clear or blue in colour, which effloresce and oxidise when exposed to the air—qualities which detract from the appearance of the crystals, but indicate a sample much the best for photographers' use. The third kind is a very rough and impure quality commonly known as "green copperas," and as such is largely used by dyers and ink-makers.

The Double Sulphate of Iron and Ammonia is a most useful salt. The crystals are more opaque and of a lighter green colour than the protosulphate, and do not oxidise on exposure to the air. This salt may, I believe, always be relied on as far as purity is concerned. If it should get accidentally mixed with other chemicals, and unfit for use from this cause, the best plan is to rapidly wash it in several changes of cold water, by placing it in a sieve and pouring cold water over it until it is considered sufficiently washed. This, of course, wastes a certain amount of the salt; but, at the same time, removes any other soluble matter with which it may have become contaminated, and the remaining portion will be fit for use.

Perchloride of Iron consists of peroxide of iron dissolved in hydrochloric acid, and may be obtained as a deep brownish-red liquid from the chemist, being a strong solution of the salt; or may be had in a more dilute form, as the tincture of steel or steel drops. This is occasionally used for reducing the intensity of negatives.

Nitrate of Iron, although formed by decomposition when sulphate of iron and nitrate of barytes are dissolved in water and the mixture heated—as in the compounding of positive developers—is not, so far as I am aware, purchased by the photographer.

Carbonate of Iron is useful as a detergent, and is sold under the name of "rouge," which, when mixed in the proportion of half-an-ounce to six ounces of dilute spirit of wine, makes an excellent polish for glass plates.

Copper.

The sulphate is the salt of copper generally used by photographers, the nitrate and chloride less frequently. The sulphate is used as an addition to the iron developer, as being supposed to confer a better colour upon the negative image than when the iron salt is used alone. It occurs in crystals of a deep, rich, blue colour, the colour being a good guide as to its purity; if adulterated, sulphate of iron is the most probable impurity.

Cadmium.

The iodide of this metal occurs in flat crystals of a pearly lustre. It may generally be depended upon for purity; if otherwise, iodides of zinc will probably be the impurity.

Lead.

The acetate, commonly called "sugar of lead," is a salt very extensively used in the arts, and may be obtained in most places. Its use to the photographer is but limited. As a source of pure carbonate of lead, when a solution of it is precipitated by carbonate of soda it is useful for mixing with gelatine, &c., to form a white opaque backing for transparencies.

Acids.

Acetic Acid.—This is one of, if not *the*, most generally useful of all the acids to the photographer. It is manufactured by a variety of methods, the oxidisation of alcohol being the object of all; the principal manufactories are in England and Germany. It constitutes the acidity of vinegar. It consists of colourless, transparent crystals with a pungent odour, and possessing a very solvent action on the skin. As usually supplied it consists of a solution of these crystals in water in frequently varying proportions. The solution known as "Beaufoy's acetic acid" is tolerably uniform in strength, and may be depended upon for purity. Another form is glacial acetic acid, which should only contain one atom of water and be solid at about 48° Fah. Its true strength and purity can, however, only be ascertained by analysis, as other acids have been added to confer this crystallising property upon weaker solutions; notably, sulphuric acid has been so used. A pure sample of acid should present the following qualities:—It is colourless, not rendered turbid or discoloured when placed in the light after the addition of a small quantity of nitrate of silver, and should possess the proper odour. It should not form a precipitate with nitrate of barytes. If the sample will pass this examination it is fit for use. Ordinary vinegar may occasionly be found useful (in the absence of the acetic acid) for addition to the iron developer. The saccharine and mucilaginous matters therewith associated, and which act somewhat as restrainers, must not be lost sight of in using it—one ounce of glacial acid being equal to about a pint of common vinegar. Some vinegar contains a large percentage of sulphuric acid; such would, of course, be unsuitable for use under any circumstances.

Citric Acid—The acid of lemons is generally purchased as a white crystalline powder, in appearance very closely resembling tartaric acid, with which it is sometimes mixed. It may also be had in crystals, in which form it is very seldom adulterated, and is, consequently, the most reliable kind to use. One ounce of lemon juice contains about half-a-drachm of solid citric acid, and should the peripatetic photographer in his wanderings ever be at a loss for citric acid the juice of lemons may be substituted, taking the precaution to filter before use.

Edward Dunmore.

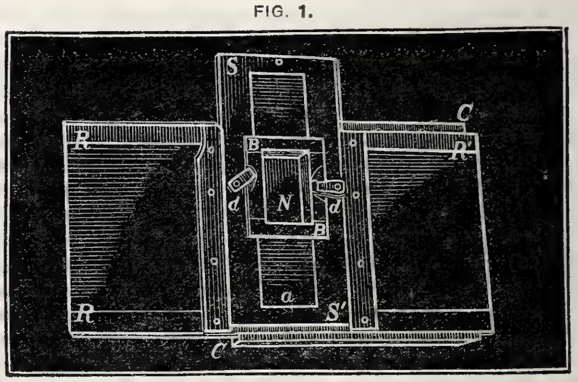
FOREIGN NOTES AND NEWS.

Fromme's Portemonnaie Calendar.—"The Multiplicator" Carbon Printing-Frame.

In a rather long article devoted to phototypography the *Photographische Correspondenz* relates how the two trade journals—the *Austrian Printers' News* and the *Printing Journal*—besides a great number of practical printers, were deceived by a specimen of phototypography called "Fromme's Portemonnaie Calendar." Various were their conjectures as to the type employed and how it had been procured small enough, when, at length, they were told that it had been set up in ordinary type, and a reduced photograph taken from that transferred to zinc and etched. The durability of the plate so obtained is shown by the fact that 60,000 copies of the little almanac were printed.

The following detailed and illustrated description of the multiplying carbon printing-frame, alluded to by Dr. Székely at a recent meeting of the Vienna Photographic Society, and by means of which eight prints can be made from one negative upon one piece of paper without opening the frame, has just come to hand. The multiplying

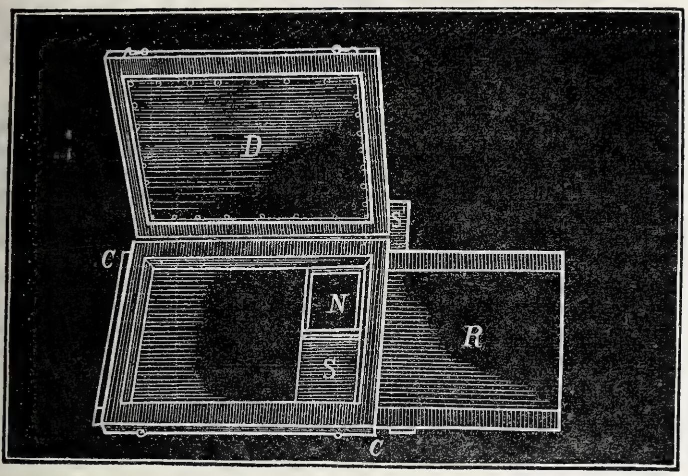
FIG. 1.



printing-frame is constructed on the same principle as the sliding *carte-de-visite* camera dark slide. There are eight separate movements, after each of which the slide is kept in place by a peg (*a, fig.* 1), which is placed in one of the eight openings corresponding to the surface size of the picture. The slide C C, which contains the sensitised paper, is in *fig.* 1 almost wholly covered by the frame R R 1, under which it runs. The slide is pushed four times from R 1 in the direction of R, then the upper slide S S 1 is pushed in the direction of S 1, the three last pictures being printed by pushing

the lower slide C C back towards R 1. In the upper slide, S S 1, there is an opening in which a small frame, B B, kept in position by two catches, *d d*, is placed. This frame contains the negative N, which is cut down to the size of the frame B B, into which it is fastened by two narrow strips of tin. In order to avoid scratching the pictures the catches *d d* are turned off before pushing the slide, so

FIG 2



that the negative may glide easily over the paper. *Fig.* 2 shows the slide C C open, and the cloth-covered underside of the lid D. In the frames constructed by the firm of A. Moll this cloth, according to Dr. Székely's advice, is replaced by india-rubber cloth.

UPON DOUBLE SALTS OF CADMIUM AND IODISING THE COLLODION.

[A communication to the Photographic Society of Vienna.]

The double compounds of iodide and bromide of cadmium are not only of theoretical interest to the chemist but of the greatest practical interest to the photographer. Croft and Hauer have given an account of their experiments on this subject—the latter correcting some statements of Croft's, and preparing a new series of double salts of cadmium—without exhausting the subject. Dr. van Monckhoven, likewise, occupied himself with these compounds, and even drew up formulæ for them which were directly contrary to those of the before-mentioned chemists, as well as to my experiments. I have prepared these salts, as well as other double compounds of cadmium, very recently, and my experience of them was as follows:—

It is unnecessary for me to point out the important part played, in the formation of double salts of cadmium, by the mixing of the single salts and their solutions. It is generally known that by the solution of ammonium and potassic iodide or bromide in presence of a salt of cadmium some double salt is formed whose soluble contents are different from those of the single salt, as was first shown by Dr. H. Vogel in his exact experiments with some of these salts. I studied the properties and soluble contents of the pure double salt, as well as those of which it is formed—by which means the vexed question of the iodising of the collodion is brought nearer to a settlement—including in the circle of my experiments only the cadmic double salts formed with alkaline metals, because it is as to the use of these in photography that a decision is required.

1. *Double Salts of Cadmium and Alkaline Metals.*—In order to give a general view of the composition of the double salts I shall give the general form by which the forms of the individual double salts may be expressed; and by which it is plainly shown that the double bromides really differ in their typical composition from the double iodides.

The double salts of bromide of cadmium, with the bromides of monad metals, have two types of composition.

The first type is expressed by the formula—

$$Cd\,Br_2 - 4\,Met^I\,Br.$$

The second type is expressed by—

$$Cd\,Br_2 - Met^I\,Br.$$

Salts having the composition $Cd\,Br_2 - 2\,Met^I\,Br$ do not exist, and every attempt to produce them only results in obtaining salts having the composition of the two preceding types. The salts $Cd\,Br_2 - Met^I\,Br$ are very stable; but the unstable salts $Cd\,Br_2 - 4\,Met^I\,Br$ are easily decomposed into $Cd\,Br_2 - Met^I\,Br$ and $- 3\,Met^I\,Br$.

The double combinations of bromide of cadmium with bromides of dyad metals are of an analogous type—

$$Cd\,Br_2 - 2\,Met_{II}\,Br_2 \text{ and}$$
$$2\,Cd\,Br_2 - Met_{II}\,Br_2.$$

The double salts of the chloride behave similarly.

The double salts of the iodide of cadmium have a different composition and different properties, the first series of double salts having the typical composition—

$$Cd\,I_2 - 2\,Met^I\,I.$$

The second— $Cd\,I_2 - Met^I\,I.$

Salts having the formula $Cd\,I_2 - 4\,Met^I\,I$, such as are found among the bromides, have not been prepared. Those having the typical composition $Cd\,I_2 - 2\,Met^I\,I$ are very stable; those having the composition $Cd\,I_2 - Met^I\,I$ are far less so; while the analogous bromide salts $Cd\,Br_2 - Met^I\,Br$ are remarkable for their stability.

I now proceed to the detailed description of the double salts, of which the following were first discovered and described by me:—Single and fourfold ammoniac bromide of cadmium, fourfold sodic bromide of cadmium, single ammoniac, single potassic, and single sodic iodide of cadmium.

A.—*Bromide of Cadmium with Bromide of Ammonium.*

1. *Single ammoniac bromide of cadmium,* $2\,N\,H_4\,Br - 2\,Cd\,Br_2 - H_2\,O$, is formed from bromide of ammonium and bromide of cadmium, bromide of ammonium and iodide of cadmium, bromide of ammonium and ammoniac iodide of cadmium. To produce it I dissolved 344 parts of crystallised bromide of cadmium (one atom) and ninety-eight parts of bromide of ammonium (one atom) in water, and crystallised the filtrate solution by evaporation. It crystallised in beautiful, shining, colourless needles, which, for the most part, were collected in clusters. This salt was first prepared by Dr. van Monckhoven; yet his formula for it, like all the other formulæ and equivalent weights of double salts drawn up by him, is incorrect. By analysing it I obtained the following result:—

$2\,N\,H_4\,Br.\ 2\,Cd\,Br_2\,H_2\,O.$		Calculated percentage.	Ascertained percentages. A.	B.
2 Cd	= 224	29·55	30·03	29·50
$2\,NH_4$	= 36	4·75	—	—
6 Br	= 480	63·33	63·09	63·10
$H_2\,O$	= 18	2·37	2·47	2·18
	758	100·00		

The salt crystallises very easily and does not oxidise on being exposed to the air, and deserves to be much used on account of this property and its great solubility in ether and alcohol (without making the collodion thick, as bromide of cadmium does). At 100° C. it gives up all its water, and at 150° C. it begins to decompose by giving up a part of its ammoniac bromide; at a higher temperature it fuses into a transparent mass, giving off the dense fumes of bromide of ammonium. One part of this salt is soluble, without decomposition, at 15° C. in 0·73 parts of water, 5·3 parts of absolute alcohol (density, 0·794), 280 parts of ether and twenty-four parts of alcoholic ether (one volume of ether and one volume of alcohol), and can be crystallised from hot water without any decomposition.

2. *Fourfold ammoniac bromide of cadmium,* $4\,N\,H_4\,Br - Cd\,Br_2$, is formed with much more difficulty than the former salt. The salts are mixed in the proper proportions (172 parts of cadmic bromide and 196 parts of ammoniac bromide) and the solution is boiled down, forming at first cubes of ammoniac bromide containing a little cadmic bromide (one to three per cent.); but, after further evaporation of the solvent, very large, beautiful, well-shaped rhomboids are formed, from the analysis of which I have deduced the following formula:—

$4\,N\,H_4\,Br\,Cd\,Br_2$		Computed percentage.	Ascertained percentages. A.	B.
6 Br	= 480	72·28	72·55	72·32
$4\,N\,H_4$	= 72	10·85	—	—
Cd	= 112	16·87	17·02	17·05
	664	100·00		

This salt is anhydrous, and is characterised by its great power of resisting oxidation and its large crystals. Dissolved in alcohol or in ether it separates into the single ammoniac-cadmic bromide and ammoniac bromide [$4\,N\,H_4\,Br - Cd\,Br_2 = N\,H_4\,Br - Cd\,Br_2 + 3\,N\,H_4\,Br$]. The former dissolves much more easily than the latter, and in that way one obtains a solution rich in cadmium, and a residue containing a great deal of ammoniac bromide. The watery solution is somewhat more stable, but the salt splits up likewise on being evaporated; on attempting to crystallise it one gets first ammoniac bromide, then salt A 2, and lastly A 1. A salt corresponding to the twofold ammoniac-cadmic iodide does not exist, and just as little the analogous potassic or sodic double salts. If one evaporate a solution of two molecules of bromide of ammonium and one molecule of bromide of cadmium it separates into the single and fourfold ammoniac-cadmic bromide.

B.—*Bromide of Cadmium with Bromide of Potassium.*

1. *Single potassic bromide of cadmium,* $K\,Br - Cd\,Br_2 - H_2\,O$, results from the evaporation of solutions of bromide of potassium and bromide of cadmium, bromide of potassium and iodide of cadmium. To prepare it one crystallises 119 parts of bromide of potassium (one molecule) and 344 parts of bromide of cadmium (one molecule) from hot water.

I obtained a double salt, whose composition is as follows:—

$KBr - CdBr_2 - H_2O$.		Computed percentage.	Ascertained percentages. A.	B.	C.
K	= 39	9·53	—	—	—
Cd	= 112	27·38	27·95	27.49	—
3 Br	– 240	58·68	58·50	58·33	—
H_2O	= 18	4·40	4·66	4·58	4·56
	409	100·00			

Well-formed columns, clear as water, which effloresce readily when allowed to lie exposed to the air, by giving up the half of their water and changing into $2 KBr - 2 CdBr_2 - H_2O$; the other half of the water is given up at 40° C. In its behaviour with ether and alcohol it differs essentially from the corresponding ammoniac double salt, A 1. With these solvents it is decomposed into potassic bromide and self-dissolving cadmic bromide. The first is soluble with difficulty in alcohol and with great difficulty in ether, yet in the presence of cadmic bromide considerably more potassic bromide is dissolved in these fluids than would be dissolved of itself; albeit the potassic bromide of cadmium cannot exist as such in solutions of ether or alcohol. One part of the double salt dissolves itself in 0·79 parts of water at 15° C., and may be crystallised from boiling water without decomposition.

Croft and Von Hauer, who first prepared this salt, obtained from a solution of two molecules of potassic bromide and one molecule of cadmic bromide a salt in the form of air-resisting needles, with a satin gloss, which only contained half as much water ($2 KBr - 2 CdBr_2 - H_2O$) as my salt, with which the temperature of the fluid during crystallisation is, at all events, decisive.

2. *Fourfold potassic bromide of cadmium*, $4 KBr - CdBr_2$, first isolated by Hauer. In its properties it agrees with the corresponding ammoniac compound; like the latter, when dissolved in water, it splits into potassic bromide and the salt B 1, and is, therefore, difficult to prepare—more difficult even than the ammoniac double salt. My preparation corresponds to the formula given by Hauer, as shown by the annexed analysis.

$4 KBr. CdBr_2$		Computed percentage.	Ascertained percentages. AA.	B.
4 K	= 156	20·86	—	—
Cd	= 112	14·98	15·27	15·03
6 Br	= 480	64·16	63·88	63·74
	748	100·00		

The crystals are large, transparent as water, and rhomboids like those of A 2; they dissolve in 1·4 parts of water. Alcohol and ether divide the salt in so far as that the bromide of potassium is thrown off as crystals, only a small quantity being found in conjunction with the cadmium bromide dissolved in the fluid. For the quantity of potassic bromide contained in the solution compare with the account given of the salt B 1.

C.—Bromide of Cadmium with Bromide of Sodium.

1. *Single sodic bromide of cadmium*, $2 NaBr - 2 CdBr - 5 H_2O$, is obtained in the same way as the corresponding ammoniac and potassic salts; it was first prepared by Croft, and my annexed analysis agrees with his:—

$2 NaBr .2 CdBr_2 .5H_2O$.		Computed percentage.	Ascertained percentages. A.	B.
2 Cd	= 224	26·58	25·96	26·66
2 Na	= 46	5·47	—	—
6 Br	= 480	57·21	57·03	57·07
$5 H_2O$	= 90	10·74	11·22	11·00
	840	100·00		

The salt crystallises with difficulty into small, white, undecided (according to Croft six-sided) flakes, which separate into cakes of the crystals adhering to each other. It resists the action of the air, and may be recrystallised without decomposition. One part dissolves at 15° C. in 1·04 parts of water, in 3·7 parts of alcohol (0·794), and in 190 parts of ether.

2. *Fourfold sodic bromide of cadmium*, $4 NaBr - CdBr_2$ is formed with far greater difficulty than the potassic salt, and can only be obtained from larger quantities of salts very slowly crystallised. I was only able to get one small sample of this salt sufficient in quantity for analysation:—

$4 NaBr - CdBr_2$.		Computed percentage.	Ascertained percentage.
Cd	= 112	16·37	16·10
6 Br	= 480	70·18	70·04
4 Na	= 92	13·45	—
	684	100·00	

It forms crystals isomorphous to those of the potassic salt, and which seem to behave similarly. JOSEF MARIA EDER.

(To be continued.)

THE THREE PORTRAITS.*

AFTER a moment's pause the lady put down the portrait and took up the case with the two in it. I wished to know if she were not fatigued, but I did not know how to convey the thought. She remarked—"It does not weary me to continue. It is a pleasure to tell you these things if it be not wearisome for you to listen."

"These two portraits came into the broker's hands when Harry Brown failed. All his goods were sold to pay his creditors, and in an old desk, which was sold as empty, the broker found the pictures and threw them aside as next to useless. Harry and his sister Nelly often wondered where their two pictures had gone to, and they tried in every way to find out, but failed. They had been kept in memory of their poor dead mother, and it grieved them much for a long time. A scene or two from their lives will show how the pictures were lost, and how Harry in the midst of his troubles met with a friend when much in need."

"'Things must mend when they are at the worst, Nelly,' Harry said to his sister with an attempt at a smile, as he ascended the ladder to take his seat on the top of the coach. The poor girl stood looking up with the tears glistening in her eyes as she cautioned him to take care of himself for her sake. The coach started, and she stood looking after it as long as it was in sight, in her heart of hearts praying that a little good fortune might attend his journey.

"His errand was not one of the most propitious in the world. He was going to seek help from an uncle whom he understood he possessed, but he had never counted him amongst his possessions until now, for he was in great need. This gentleman was their mother's brother (she died years before). In consequence of his sister's marriage they had quarrelled, and so the uncle had never seen his sister's children. The fact of Harry's father marrying again had made the breach wider than ever. After the father's death the two children, now grown up, stuck to each other and struggled on. Harry started as a small manufacturer, and for five years he had made great head way, when a large firm, considered as good as the Bank of England, stopped payment, and Harry was one of those who were ruined by the smash. Manfully he gave his creditors all that he was possessed of, and then he and his sister stood ready to begin the world again. Now he must have some work or some means to start again, and Nelly had thought of their uncle. So here he was on the top of the coach. He is no sooner seated than they are rolling along the road; then the shadows gather round him, and he begins to repent him of his journey. 'It's a regular wild goose chase,' he thought. 'No man in his sane senses would give money or help to a fellow whom he had never seen before. And then he wasn't friends with mother. I wonder what I would do myself in the same circumstances.' He was rather startled in his reverie by the old gentleman who sat next him, saying with a quiet smile—

"'So, young man, you think when things are at their worst they'll mend?'

"Harry's thoughts hadn't improved his temper. 'Any fool knows that,' he replied, with a bitter laugh; 'but the difficulty with me is to know when the worst has reached me.'

"'I thought from the way you put it to the young lady at starting that the worst had really come.' There was a tone of sympathy and friendly interest in the old man's voice that drew Harry nearer to him.

"'Oh! bless you! that was only to make her keep up her heart when I am away.'

"'But you are both so young that the worst in your lives must be a little thing at best,' the old man said questioningly.

"'May be, sir.' Harry's face grew serious as he continued. 'But every shilling that we have made these five years has gone.'

"'How so?'

"'Through no fault of my own.'

"'Well, then, how did it take place?'

"'You have heard the old saw, sir—Never carry all your eggs in one basket. I did, and they are all gone to smash.'

"'If you would be more explicit I may be able to give you some advice. I have seen a good deal of the world, and I dare say know its ways better than you,' said the old man kindly.

"'One doesn't like to rake up sore points that we would rather forget, but kindness has a wonderful effect on a man when he is down. Your very interest, sir, is a kindness that makes my heart beat quicker, and my sympathies draw closer to you. My position is this:—You see I worked for Colt and Colt, the great export merchants, as they were open to take all the goods that I could produce in my small way; and, backed by the universal opinion that they were as good as gold, I never dreamt of dividing my trade or seeking another market. They failed and I fell. When the news of their failure reached me I thought it would have driven me mad. I didn't save a shilling out of the wreck.'

"'It was very hard lines, indeed,' the old man said, half to himself and half to Harry. 'Did you lose much?'

"'Well, it might not be considered much to some people, but it was my all—that's where the magnitude of it comes in—about three thousand pounds, sir. I have toiled these five years to amass it, just to make Nelly and I a little independent. And here this giant concern, which proclaims to the world "See how great I am! see how firmly I stand!" comes smashing down, killing dozens like me in their fall. Four hundred thousand pounds! Is it not monstrous?'

"'It is indeed very hard to hear,' the old man said, as he took the young man's hand and pressed it between his own. 'And did you give up furniture and home and all?'

* Concluded from page 152.

"'Oh! yes, I did'nt mind that so much. One little thing I requested more than all the furniture—two little portraits that belonged to my mother, which had been put away for safety, but so safe that we have never been able to find them.'

"'What is your name, if it be not rude to ask?'

"'Harry Brown, sir.'

"'Harry Brown!' the old man repeated musingly, as if he had heard it before.

"'Yes, sir, and I am on my way to pay a visit to an uncle of mine—a gentleman I have never seen; but if he take after my mother—God bless her memory!—he is sure to help me on the way to something. Mr. Duncan is his name, and he resides at Landtown; so thither I am bound.'

"'I am going to Landtown also,' the old man said.

"'Oh! I'm glad. To have one to talk with is something on the top of a coach. It is so much better than looking suspiciously at one side and then turning to the other. You venture on the original remark that it is a fine morning, but neither of your fellow-passengers thinking that you have addressed him, you receive no reply. Then you shut your eyes as if you would like to sleep, and so, yawning and humming a tune and yawning again, you manage to pass the journey in as disagreeable a manner as possible, both as regards yourself and your fellow passengers.'

"The old gentleman enjoyed a hearty laugh at Harry's description, and said:—'And now, if this Mr. Duncan do not receive you kindly, what are you going to do then?'

"'I don't know, but one must try all chances, and Mr. Duncan is my first. It was little sister Nelly, whom you saw at the coach, that thought of uncle first. "Now Harry," she said, "you go right away to uncle George and see what he is like. If he be like mother, he will at least, if he cannot help us, give us his sympathy and advice; and the advice of one who has seen so much more of the world may turn out of great value to you."'

"'She was a very sensible girl,' said the old man thoughtfully, resting his chin on the knob of his umbrella, and vacantly gazing over the green fields past which they were whirling.

"'Yes; she wouldn't rest till she got me started, and so here I am. And, do you know, I feel ever so much better since I have related my troubles to you.'

"'Woa! Woa!' and the coach comes to a standstill in front of the Cross Keys, the hotel of Landtown, and with a hearty shake of the hand the two men part.

"'Waiter! can you inform me where Mr. George Duncan, of your town, resides?'

"'Oh! yes, sir, to be sure, sir,' replied the waiter in his fussy way; 'Mr. Duncan is our Mayor, sir. If you turn to the left when you leave the hotel, and go along the highway about a mile and a-half, you will come to the lodge gate.'

"'Thank you,' Harry said, taking up his hat. 'I will be back to dinner at four.' He sauntered away out under the shadow of the trees that lined the road. He had no idea of rushing on his fate, but he wanted to have a quiet look at the house of his unknown relation. On he went till he came to the lodge, but the house was invisible, being embedded in trees. He must enter the lodge gate if he desired to see the house. He rang the bell; the gate was opened to him without question, and he passed in. On he walked till he came quite unexpectedly in front of the house. He stood for a moment irresolute whether to turn back or go on, when he perceived a little old man servant come trotting out of a side entrance and approaching him. Harry stood, expecting him to say 'Well, sir!' or 'Whom do you wish to see?' but he was rather staggered when the man-servant with a bow said—'Mr. Brown, I believe, sir?'

"'Yes,' was all Harry could say in his surprise.

"'Please step this way.' And the old man turned and made for the house. Harry followed him thinking—'Now Nelly must have written to uncle to let him know that I was coming, and by that means make it easier for me—the sly little puss! But it so strange that she should do this and say nothing of it.'

"'Mr. Duncan wishes to see you, sir.'

"Harry left his hat and coat in the hall, slightly nervous. He followed the servant to the dining room where the master was seated at lunch.

"'Come away, Harry!' said the cheery voice of his fellow-traveller as he stood up with a welcome smile on his face, and the grasp of friendship in the clasp of his hand. 'I had a cover laid for you,' he said, with a laugh. 'I knew you would be here to lunch without an invitation—pure force of will!'

"Harry's face turned crimson as he thought of his free talk about his uncle—to the very man himself.

"'Now don't put yourself out of sorts about what we have said to each other, but just sit down and make yourself comfortable.' Rising, he pushed him down into his seat, and looking into Harry's blooming face with a merry twinkle in his eye, he said:—'Any fool knows when things are at the worst they must mend. So you are going to have your lunch, at any rate, at my expense.'

"Harry sat in confused silence. He couldn't speak a word. It had all turned out so different from what he had expected.

"They sat in silence a little during lunch. At length the old man said:—

"'And so, Harry, I know all your story without your saying a word to uncle George about it. I venture to swear you told it much more freely than if you had to tell it now. And now, lad, that we are introduced to each other, and we are comfortably seated here as nephew and uncle, I may as well begin by asking your pardon.'

"'Asking my pardon, sir!' Harry exclaimed in astonishment.

"'Yes, boy, the pardon of both you and your sister. What business had I to leave the children of my own sister all these years without once seeking them out; without trying to find out if they were worthy, and without putting myself in the way of being of service to them. But we grow so miserably selfish,' he said in the bitterness of his heart, as he paused for a moment. Harry only looked and listened; he was perfectly bewildered.

"'You see, Harry, I never liked your father, and so when your mother married I was so angry with her—God forgive me!—that from that day she went quite out of my life, and our interest in each other died until today. Chance or fate threw us together, and just, too, when I am in want of a young fellow to manage my place here, and a housekeeper also!'

"Harry had a shrewd suspicion that he was just making situations to fit him and his sister, but he felt very happy.

"'Now, you know, these places will just suit you and Nelly. I think I was very fortunate in meeting you to-day.'

"'But, oh! sir,' Harry said eagerly, 'you do not know what you are proposing. You have had no time to reflect. What do you know about us?'

"'As much as I want to know. In fact, as far as my purpose is concerned, as much as if I'd known you for a hundred years. You stay here to-night, Harry, and tomorrow you will go and bring your sister here; as there is plenty of work for you both, this shall be your future home.'

"Harry, with tears in his eyes, thanked the old man again and again, and so it was arranged."

"Harry Brown has just returned from working in the forest where he has been superintending the planting of some trees. Nelly is sitting reading to uncle George. The two faces light up with pleasure as he enters, and his smiles back a reflection of theirs. So we leave them.

"And now I am done. Thus have I shown to you a few shifting slides from the history of the past brought back to me by being in connection with these faint impressions of the photographic art. Good night!"

Jack lifted the pictures and we together left the room. As he was parting with me at the door he said—"Well, Mark, what do you think of it?"

And I replied:—"There are *stranger* things in heaven and earth than are dreamt of in *our* philosophy!" MARK OUTE.

Meetings of Societies.

GLASGOW PHOTOGRAPHIC ASSOCIATION.

A MEETING of this Association was held in the "Kibble" on Wednesday, the 26th ult., at which there was a numerous attendance of members and their friends. Mr. John Stuart occupied the chair.

The company, prior to entering on the more serious portion of the business, enjoyed a stroll round the great circular garden palace of crystal, completely filled with statuary, shrubs, and flowers. The pond in the centre, with its gold fish, proved also an attraction. Then the moss room, with its gothic formation and numerous varieties of these beautiful lichens, attracted many admirers. Then, again, the Highland loch and its rocks, islands, miniature castles, steamers, boats, &c., &c., so natural in appearance, were greatly to be admired and certainly gave pleasure to all present.

After the enjoyment of the above pleasing sights the company adjourned to the lantern hall, which accommodates 500 persons, and which on this occasion was pretty well filled. There was a fine selection of views exhibited on the forty-feet screen—first of Arctic views, and then a large number of Scotch views. Mr. Stuart introduced the lecturer, who gave a very pleasing description in connection with the series of pictures. Music lent its charms to the exhibition, a lady presiding at the piano adding greatly to the pleasure of the entertainment.

The CHAIRMAN said the Society, after long years of somnolence, had waked up to a life of activity and, he hoped, of usefulness. He supposed the carbon question was partly the cause of photographers drawing so much together just now, and as permanency of result could now be guaranteed every one taking an interest in the art should work to that end. He hoped there would be many meetings like the present.

Mr. ROBERTSON said meetings of that kind might be expected to add to the membership. And, as the model society—the Edinburgh Photographic Society—admitted ladies he thought their Society should do the same. Ladies ought to take as much interest in photography as gentlemen, they were equally interested in a charming picture; and the number of the fair sex employed in connection with the art was very large. He hoped, when the session commenced in September, the ladies present would add to the pleasure of the Treasurer by becoming members, thus also increasing the funds.

The CHAIRMAN proposed a vote of thanks to the lecturer and the lady pianist.

Mr. BOWMAN proposed a vote of thanks to the Chairman.

Both propositions were heartily responded to, and the meeting separated, having enjoyed a very pleasant evening in the "Kibble." It should here be mentioned that the name of Mr. Kibble, the builder of the palace, is associated in the memory of the older Glasgow photographers with respect. He was chairman of the former Society, was a wealthy and enthusiastic amateur, and at an early date produced many wonderful pictures of immense size and great excellence.

Correspondence.

LEA'S NEW DEVELOPER.

To the Editors.

Gentlemen,—Having prepared, a few days ago, some of Mr. M. Carey Lea's collo-restrainer by the method (subject to a slight modification as under) published by that gentleman in your issue of March 3rd, I wish to record my experience as an encouragement to others to give it a trial.

I used sheet gelatine, which, when it had absorbed all the dilute acid, was dissolved by the aid of heat in an open vessel. The liquid was then boiled for two hours in a Florence flask, diluted with water to its original quantity, the prescribed amount of granulated zinc added, and it was then boiled for an hour and a-half more and filtered while hot. On adding a drop of this preparation to two ounces of plain iron of the strength of twenty-five grains per ounce, and developing a plate with the solution, the result was everything that could be desired.

The collo-developer was then tested against the ordinary developer of the same strength with various collodions, on double-quarter plates cut through, each half being exposed together and developed with a different solution. The former showed a decided superiority, especially in the fine character of its deposit. It has since been put into general use, and the results, in the opinion of my colleagues and self, prove it worthy of the character given to it by Mr. Lea.—I am, yours, &c.,

Chichester, May 2, 1876. John Harmer.

"PINE" AND "DEAL."

To the Editors.

Gentlemen,—In my last letter I said that pine and deal are not quite the same thing; but I am now rather better informed in timber technicalities.

Pine appears to be most free from turpentine, is an easy-working wood of medium colour, and least durable in exposed situations. White deal—the wood of the spruce fir—has more turpentine. Red deal, commonly called "deal"—the wood of the Scotch fir, and, I believe, also of the larch—is the more durable of the tribe, and contains most turpentine.

Now the "Kennett" plate I referred to had been kept in a red deal box; this should be more trying to it than pine. The other plate had been kept in a white deal box. The drying cupboard has been made with Mr. Kennett's enemy—pine. I hope to hear more on this subject.

I notice that Mr. J. Brier, jun., uses a backing of which Bates's black varnish is a constituent; this contains spirits of turpentine, nevertheless his plates do not seem to be affected by it.

It may be worth while to suggest that those who have pine plate-boxes, or have a preference for that wood, might get over the difficulty by varnishing the inside of the boxes with coachmakers' varnish, and then fitting them with grooves of oak, maple, or other harmless wood. I think that if some enterprising manufacturer were to make ebonite V grooving, in lengths of a dozen or two dozen grooves' wide, it would prove to be better than any kind of wood, which latter must be more or less ravelled by the edges of the glass.—I am, yours, &c.,

Herbert B. Berkeley.

Cotheridge Court, Worcester, May 1, 1876.

P.S.—May I ask what is the objection to keeping hyposulphite of soda solution in a glazed earthen jar, with tap, removed from the action of light?—H. B. B.

MR. M. CAREY LEA.

To the Editors.

Gentlemen,—I have been arraigned before the photographic public by the above-named gentleman for plagiarism. This is the first time a charge of this character has been preferred against me in the many years I have, to a limited extent, been known to the photographic fraternity. I therefore confess to a feeling of embarrassment about my ability to select language in vindicating myself that shall not give offence. This to me is the most unpleasant task I have ever undertaken with the pen, and it becomes more especially so from the fact that the gentleman with whom I have to do is one (although we are not personally acquainted) whom I have for many years thought of only with esteem and respect.

Mr. Lea, in closing his notice of me, has sweetened his article by a few charitable words:—"I do not suppose for a moment that Mr. Newton intended to take without an acknowledgment a process originating with another. It was, doubtless, a case of the same idea occurring to two different persons." This charity, in conjunction with what immediately precedes it, is easily convertible into irony. Under the most favourable construction, however, the saccharine element thus added is sufficient to neutralise but a small portion of the acid contained in this curious compound. Mr. Lea, of course, understands that my veracity and integrity are assailed, and he will also understand that it is my business to clear from my character that which he has so carelessly flung at it; and in vindicating myself I shall not ask those who read this vindication to take my uncorroborated statements against Mr. Lea's.

In the first place, I deny having ever seen the article upon which Mr. Lea bases his claims, so far as my recollection serves me, until my attention was called to it by Mr. Lea's charge in The British Journal of Photography, in the number of the 25th of February last. I did not take the Journal at that time, and seldom saw it. If I had seen it, however, and read the article referred to, I should never have suspected that it contained, even in embryo, the formula which I subsequently published. No one else ever suspected it. There is nothing in the paragraph on which Mr. Lea bases his claims that in any essential particular is similar to mine.

Before proceeding further in this direction I wish to call the attention of the reader to the reason which Mr. Lea gives for putting forth this claim at this late day. He does this (if we are to credit his statement) as a mild kind of punishment for something he imagines I have done. I say "imagines," for it is imagination or pure fiction, as I have never made any public statements of comparison between his emulsion and mine unfavourable to his or any one else's; and Mr. Lea will find it difficult to refer to any paragraph written by me to justify him in such a statement. He says:—"I believe it is said that the last-mentioned [referring to his emulsion] requires a double exposure or something of that sort." This is the language he attributes to me. Now I submit that this is a most careless and loose way of making a specific charge. Why does Mr. Lea not refer us to the time when, and the place where? I will answer: simply because he cannot. We are, therefore, compelled to come to one of two conclusions—Mr. Lea has been imposed upon by some gossip, or it is a mere pretext or excuse. I have been naughty; therefore I deserve punishment, and he appoints himself to the task.

Mr. Lea has, no doubt, seen the paper which I read before the Photographic Section of the American Institute on the 4th of May last. In that paper I stated distinctly what led me to this line of experiments. I stated facts just as they existed, and also stated that I then had some of these emulsions *over two months' old.* I was then speaking in reference to their keeping qualities.

Mr. Lea has to falsify this statement in order to make out his case. His article virtually says this is not true. The formula on which he bases his claim was published in The British Journal of Photography of March 12, 1875, page 123. Mr. Lea must be aware that the Journal is not received on this side of the Atlantic until twelve or fourteen days after the date of its publication. I therefore could not have seen his article before the 25th or 26th of March under the most favourable circumstances, if I saw it at all. You will readily see that if I had taken my ideas from his published article I could not have had these emulsions over two months' old on the 4th of May, 1875. If that statement of mine be true it disposes of the question of plagiarism as far as I am concerned.

There is still further evidence in the paper of mine referred to. In closing that paper I say:—"Since writing the above my attention has been called to Mr. M. Carey Lea's formula for salting collodion for emulsion dry plates, the novel and important feature of which is the adding a small percentage of the iodide of ammonium to the bromide collodion." The formula here referred to, and to which my attention was called, was a part of the same letter which contained the paragraph on which Mr. Lea has based his charge against me. It is conclusive evidence, to my mind, that I had never seen the article until a few days previous to my reading the paper on the 4th of May, said paper having been prepared before my attention was called to that particular formula of Mr. Lea's. As I always try whatever strikes me favourably, and without unnecessary delay, I gave Mr. Lea's new formula for salting a trial, and obtained results as stated in my paper.

I will now give you an extract from the article on which Mr. Lea has based his charge and claim. A very slight analysis will be sufficient to show the utter untenableness of the claim put forth by Mr. Lea. This will be made more conspicuous if, after the article I am about to quote is digested, you read what Mr. Lea says it means in his article devoted to it in The British Journal of Photography of February 25. The article is headed (but in small capitals) thus:—*Chloriodo-Bromide Emulsion with Excess of Alkaline Bromide.* Mr. Lea remarks, in his article in the number of the 25th of February, that perhaps the last word in the heading should have been "chloride." Perhaps it will be found that a good many things might have been different, and been much better comprehended for the difference. So much for the heading. He then proceeds:—

"The formula for the emulsion is the same precisely as the foregoing, except that the *aqua regia* is omitted, and the proportion of the silver nitrate reduced. In this case the collodion requires for exact saturation eighteen and two-third grains of silver nitrate; seventeen or eighteen grains may, therefore, be added.

Of course if we attempt to come so near as eighteen grains it will be necessary to be very exact in all measurements and weighings. If seventeen grains be used so much exactness will not be required, but a slightly inferior degree of sensitiveness may be expected. *As in the former case, the cupric chloride should be added last.* With this emulsion the addition of the cupric chloride after the silver nitrate has this further advantage—that the emulsion is thus left for a time in presence of excess of soluble silver salt, which is favourable for sensitiveness."

In this quotation the italics are mine, except the words *aqua regia.* After reading the above I wish to call your particular attention to my paper of the 4th of May, published in THE BRITISH JOURNAL OF PHOTOGRAPHY on the 4th of June, and also in the June numbers of *Anthony's Photographic Bulletin* and the *Photographic Times.* You will see that the line of my experiments was based on adding an excess of nitrate of silver to the emulsion and permitting the action of the unconverted silver on the emulsion for periods varying from three to thirteen hours.

In this formula of Mr. Lea's does he give an excess of silver? Certainly not, but just the opposite, the iodide and bromide salts being in excess. He says eighteen and two-third grains of the silver nitrate are necessary for exact saturation. He then points out the difficulty attending exact weighing, and tells the reader to take less than sufficient for exact saturation—say seventeen grains. The only inference anyone can draw from the language used is that care was necessary *not to get an excess of silver*, and if the formula be followed one would probably succeed in that, if nothing else.

Now let us examine what Mr. Lea says about adding the chloride. I will, in the first place, call your especial attention to the first paragraph in Mr. Lea's article with my name at the head in the number of THE BRITISH JOURNAL OF PHOTOGRAPHY of the 25th February. He then states what occurred to him last winter. You will observe, by referring to my article of the 4th of May, that Mr. Lea has here used my ideas there expressed, and almost the identical language.

Now I wish to call your attention to the heading of the paragraph which, he claims, conveyed to the photographic public these ideas. If Mr. Lea was, as he now claims, in possession of these ideas, and supposes he expressed them in the article from which I have made the above extract, he has, undoubtedly, been labouring under a very extraordinary hallucination, and has probably relied for success in this claim mainly on the closing paragraph of this article, where he says—"The emulsion is left for a time in presence of the excess of soluble silver salt."

This statement, however, is entirely destitute of any force or meaning from the very fact that it is incorrect. The emulsion has never been in any such condition; there has never been an excess of soluble silver salt in it; and the only caution there is in the whole formula is to guard you against such an occurrence. He tells you in his article of the 25th of February that he finds, by referring to his note-book, that he left the excess of silver nitrate in contact with the emulsion six hours before adding the chloride. We will see what he said about it on the 12th of March, 1875. By referring to his article of that date, as quoted above, you will find this:—"As in the former case the cupric chloride should be added last." Now please read the last paragraph of the first column of Mr. Lea's article from which I have quoted—page 122 of THE BRITISH JOURNAL OF PHOTOGRAPHY, March 12, 1875—and you will find just what Mr. Lea means when he says "add the chloride as before," and his reason for so doing fully explained.

Now, after several months' experimenting, I had fixed upon and published, last fall, that six hours should elapse after the silver was added to the emulsion before adding the chloride. Mr. Lea claims to have discovered the same thing in his note-book. That note-book, I am constrained to think, is a very unfortunate book for Mr. Lea, and his case would appear much better before the photographic fraternity if he had omitted any reference to it.

I should apologise for taking up so much valuable space on a mere personal matter, and I have no doubt many will wonder, in view of the facts, that I have used so much space to show that I did not see the article on which Mr. Lea rests his claim of priority, as it must be apparent to everyone that it could not possibly have made any difference whether I did or not. I was referred to many experts in photography to show that my process was nothing new, and was informed by one writer that I had been anticipated by two years by Mr. Stillman. But none of the gentlemen in their researches ever made the discovery that Mr. Lea had the whole thing concealed in his little note-book. If I alone rightly interpreted the mysteries of that formula the least that could be done would be to credit me with more than ordinary acumen. Mr. Lea evidently has not a very high opinion of the claims put in for Mr. Stillman and those other gentlemen. In all that I have ever written I have never set up a distinct claim for priority in any one thing. It is not to establish that for which I am now writing. I uttered a falsehood in my paper of the 4th of May, or I told the truth. This is the most important question to me. If anyone had published my formula as their own and not mentioned my name they probably would never have heard from me. I repose implicit confidence in the photographic fraternity, and whatever they accord to me I gratefully accept and am satisfied.—I am, yours, &c., H. J. NEWTON.

New York, April 11, 1876.

PHOTOGRAPHY IN COURT.

MALICIOUS DESTRUCTION OF A PHOTOGRAPH.—At the Liverpool Police Court, on Friday last, the 28th ult., before Mr. A. B. Forwood and Mr. E. Banner, Mr. William Carson, engineer to the Wallasey Local Board, was summoned at the instance of Mr. R. G. Powell, designer, Duke-street, for wilfully destroying a photograph, value 7s. 6d. Mr. Bremner, barrister, appeared for the complainant, and Mr. Simpson for the defendant. The summons was taken out under the "Malicious Injuries to Property Act." It appeared that Mr. Carson gave an order to Mr. Powell to make a model of the proposed new landing-stage to be constructed at Seacombe. The model was made and was publicly exhibited at the offices of the Wallasey Local Board; but, before he sent it in he had a photograph taken of it, which he exhibited in his window, with the label, "Seacombe Ferry Approaches; model of the works about to be constructed by the Wallasey Local Board, supplied by Mr. R. G. Powell." One day Mr. Carson went to the shop while Mr. Powell was away, and, taking the photograph out of the window, tore it up and broke the frame and glass. The destruction of the photograph was admitted, and the defence was that Mr. Carson acted under the belief that the Wallasey Local Board were prejudiced by the immature publication of the photograph, and that if he had a fair and reasonable supposition that he had a right to do what he did he was excused under a section of the act. The bench considered that Mr. Carson had such a supposition in his mind at the time, and were about to dismiss the summons, but Mr. Bremner asked for a case for a higher court. The bench thought the matter was such a small one that it was a pity there should be further litigation. Mr. Simpson then withdrew the defence and admitted the facts, and the bench imposed a nominal fine of one shilling without costs, which would have the effect of settling the matter without taking it into another court. Mr. Carson would also have to pay the damages, 7s. 6d.

WINDUS *v.* PEAT: AN "AWKWARD CUSTOMER."—This was an action brought in the Bloomsbury County Court, on Friday, the 21st ult., in which the plaintiff sued the defendant, a photographer, of Kentish Town, to recover the sum of ten shillings and sixpence under the following circumstances:—From the plaintiff's statement it transpired that about two years ago he subscribed to a photographic portrait club, of which the defendant was the secretary, to whom he had made frequent applications for his portrait, when he was told to apply to a Mr. Raymond. To the latter he also applied as many as fourteen times, and was ultimately told by Mr. Raymond that he, too, knew nothing at all about it. Therefore, in consequence of neither getting his portrait nor the return of his money, he brought the present action.—The defendant being called said that he had received the amount of the plaintiff's subscriptions and handed it to Mr. Raymond, whose duty it was to execute the photograph, as he (the witness) only acted in the capacity of secretary to the club.—Mr. Raymond stated that he had received the plaintiff's money from the last witness, and a proof was sent to the plaintiff, who, not being satisfied, another sitting was given. The plaintiff was a very awkward customer, and there was no satisfying him.—Mr. Charles Cork, of the firm of Cork and Co., Euston Photographic Depôt, 174, Euston-road, stated that while repairs were being done to the studio of the last witness he was asked by him to take any club subscribers that were introduced to him, amongst whom was the plaintiff, who gave him infinite trouble and was (as his honour might see) a very awkward customer (laughter in court), and as photography could not make him "beautiful for ever" the plaintiff, who had received an artistically-posed and well-executed picture, was dissatisfied with it, for no other reason, he (the witness) supposed, than that it was not good-looking enough (renewed laughter).—At this stage of the case the learned judge said that after the evidence of Mr. Cork and the defendant's witnesses he should give judgment in favour of the defendant, with his costs and those of his witnesses. The plaintiff left the court grumbling loudly at the result of his case.

EXCHANGE COLUMN.

No charge is made for inserting these announcements; but in no case do we insert any article merely *offered for sale*, that being done at the small cost of one shilling in our advertising pages. This portion of our columns is devoted to exchanges only. It is imperative that the name of the person proposing the exchange be given (although not necessarily for publication, if a *nom de plume* be thought desirable), otherwise the notice will not appear.

A 21 × 14 rolling-press will be exchanged for a burnisher, posing chair, or 12 × 10 view camera.—Address, TEAR, photographer, New Wimbledon, S W.

A Cleary burnisher (of no use to owner) will be exchanged for a good studio stand or furniture. Burnisher is quite new.—Address, J. COOPER, 8, Mersea-road, Colchester.

I would exchange a *carte-de-visite* camera and lens, by Underhill, and a quarter-plate camera and lens, for anything useful in the trade.—Address, J. HINCHCLIFFE, photographer, Dewsbury.

Excellent tourists' camera, Kinnear pattern, for plates 11 × 9, very compact, in lock-up case, also lens for same and portable tripod, in exchange for a larger size for outdoor work, or enlarging camera fifteen to eighteen inches, or other useful offers.—Address, H. BROWNING, Piccadilly, Hanley.

ANSWERS TO CORRESPONDENTS.

PHOTOGRAPHS REGISTERED—

James Paton, Greenock.—*Portrait of Mrs. E. H. Stewart.*

Richard Ward and Co., Cork.—*Photograph of Lunatic Asylum, Cork.*

C. Sanderson and T. Parkinson, Preston.—*Three Photographs of Dog "Morgan."*

Barton and Sons, Blackburn.—*Two Portraits of Peter Taylor and Dog.*

B. Wyles and Co., Southport.—*Portrait of Walter Smith, Esq., Mayor of Southport.*

☞ *Correspondents should never write on both sides of the paper.*

A. S. STEVENSON.—We have only examined the salt to such an extent as to warrant our asserting that it is not nitrate of silver.

A. ANDERSON.—We have the description of the apparatus nearly in a state of readiness for publication. We shall probably find room for it in our next number.

H. C. COGSWELL.—The presence of a trace of carbolic acid will prevent the gelatine solution from decomposition, and will not injuriously affect its good qualities.

D. D. SCOTT.—We received the newspaper cutting; thanks. At first we felt slightly irritated, but this feeling soon passed off, giving way to one of amusement.

R. EATON.—The value of Mr. A. L. Henderson's suggestion of the addition of nitrate of barytes to the silver bath is now generally recognised. The formula has been published.

S. S. P. M.—Chlorine will undoubtedly eliminate the hyposulphite of soda; but you must not forget that an excess of chlorine will bleach the photograph as well as decompose the hyposulphite.

REV. J. BRUCE.—An excellent negative varnish may be made by dissolving an ounce of sandarac and an ounce of thus in twelve ounces of methylated alcohol, to which a few drops of oil of lavender are added to destroy the unpleasant smell.

LEX.—The intensity in the print is easily accounted for. The negative is of a deep brown colour, which is much more intense than at first appears. The best way to reduce this intensity is to treat it with a solution of bichloride of mercury.

J. S. BAXTER.—The fogging of the end of the plate is caused by a leakage of light at the sliding shutter. We were troubled in the same way with one of our dark slides, but by gluing in a slip of narrow velvet ribbon the evil was entirely prevented.

T. V. E.—There is no stereoscope to equal in efficiency, and possessing such facilities for the examination of pictures, as that which was invented by Mr. Oliver Wendel Holmes, of America. You will find details of it in a former volume, of which you are in possession.

BRITISH OAK.—We cannot indicate any particular dry process as being superior to another. As the worst have almost died out you are safe enough in adopting any of those in use at the present time. As regards the use of an iron developer for dry plates, see an article on this subject in a recent number.

G. D. F. R.—To have copyright in the portrait it is necessary that such copyright shall have been transferred to you in writing at the time of the sitting. From your own showing, however, the portrait was executed to the order of the sitter, who paid for it. This completely debars you from claiming any proprietary interest in the copyright.

F.—A grain may be obtained by interposing between the negative and the bichromatised sheet a piece of thin muslin; but a far better mode of procedure would be to grain the stone. The print to which you allude was produced in America, the stone having been prepared with a saponaceous body with which the bichromate was mixed.

G. S. DUMAS.—England's collodio-albumen process was much thought of at the time of its introduction, and we know from personal experience that it afforded the means of producing good negatives; but it seems to have been discarded in favour of other processes which may not be better. A detailed account of this and other dry processes will be found in our more recent ALMANACS.

F. G. S. (Walworth).—There was no useful purpose whatever served by your adding the albumen to the gelatine unless you brought the solution to boiling point afterwards. It is in this after-boiling, or strongly heating, that the whole virtue lies; for it causes the solidification of the albumen, which, in coagulating, embraces in its grasp every atom that previously clouded the gelatinous solution. Simple filtration through muslin afterwards suffices to remove the altered albumen.

J. S. N.—The system which you have yourself suggested appears to be so complete as to leave us nothing to add by way of suggestion. The effect of a white screen overhead and illuminated by the direct rays of the sun will be similar to that of a very white, luminous cloud; and by having a dark movable screen interposed between this "cloud" and the sitter a variety of effects may be obtained. The louvre-board system shown in the sketch will enable you to effect the necessary control over the side light.

C. H. F. C.—With respect to the former part of your letter: when any portion of the surface of a coated plate falls away from the glass in the form of flakes it is a sure indication that the iodides (or bromides) present in the film are too much in excess. The manner in which a weak and a strong bath operate in the production of this result was long ago pointed out by Major Russell, the only investigator, so far as we recollect at present, who has "gone into" this subject in connection with the *rationale* of a cure. We may have occasion at no distant period to go more minutely into this phase of practice.

WINLOCK.—The specification of the patent is not yet printed; when it is our readers will soon be made acquainted with the whole matter. Your ideas respecting the arrangements are rather confused. It is quite true that in six months after the date of an application for a patent the specification is open to the inspection of the public; but it is not true that specifications can *then* be purchased. Several months more invariably elapse ere they are printed, and until this is done persons are only allowed to examine the specification upon payment of a fee of one shilling.

J. T. BAINBRIDGE.—Our correspondent says:—"In making collodion transfer enlargements I have been in the habit of toning them with a solution of bichloride of platinum about ten grains to the ounce; but I find, on trying a fresh sample, the picture, instead of toning to a purple-black, becomes quite white, as if I had used chloride of copper. I may say that I had two samples of bichloride of platinum, obtained from two different chemists. Both act alike—that is, turn the picture white instead of black."——As we have never had experience similar to that of Mr. Bainbridge, we throw the question open to other correspondents. It is true that we have never used bichloride of platinum that has been *purchased* for the purpose, having always made it ourselves. We never previously heard of its having a bleaching action.

A. DONALD (Dundee).—Our correspondent has forwarded a sample of the collo-restrainer so recently introduced by Mr. M. Carey Lea. "With this collocine," says Mr. Donald, "I have no trouble in producing a good negative at once, without the preliminary waiting of two or three days, as mentioned by Mr. W. Brooks at the last meeting of the South London Photographic Society. The sample sent is, however, diluted so that one drop is equal to half-a-drop only. It was made on or about the 8th or 9th of March last—a few days after the formula appeared in the Journal. I have been working with it ever since. I have just tried a plate with—

Iron	2 ounces.
Water	15 ,,
Alcohol	½ ounce.
Collocine	1 drop only.

(The last-named diluted equal to half-a-drop of collocine.)

I gave five seconds' exposure; stop one inch aperture; and the result a good printing negative. This in the studio, and all the curtains drawn to shut out the light. I filter the iron and water before (not after) the addition of the drop of collocine. Shake well the bottle of collocine before, and the iron solution after, the minim is added. As the liquid sent will speak for itself it requires no commendation."——Mr. Donald is certainly justified in speaking of the collocine in the way he does. We thank him for the sample he has sent.

RECEIVED.—B. C.; H. W. D.; J. T. (Fochabers); "Beginner"; A. J. S.; and J. Latham. These in our next.

SOUTH LONDON PHOTOGRAPHIC SOCIETY.—At the forthcoming meeting of this Society, on Thursday next, the 11th inst., to be held at the House of the Society of Arts, Adelphi, Mr. W. Wilkinson will read a paper *On the Difference between Collodion and Carbon Transparencies.*

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.—The next meeting of this Society will take place on Tuesday next, the 9th inst., at the Gallery, 5, Pall Mall East (the summer exhibition of paintings by the Water Colour Society being on view), when Capt. Abney, R.E., F.C.S., will read a paper *On a Method of Measuring the Diurnal Photographic Intensity of Daylight.*

LONDON GAZETTE, *Friday, April* 28, 1876.

DECLARATION OF DIVIDEND.

MELTON, J. A., Chatham and Sheffield, photographer—first and final dividend of 4s. 10¾d., any day at Mr. Acworth's, Rochester.

METEOROLOGICAL REPORT,

For two Weeks ending May 3, 1876.

Observations taken at 406, Strand, by J. H. STEWARD, Optician.

THESE OBSERVATIONS ARE TAKEN AT 8.30 A.M.

April.	Bar.	Wind.	Wet Bulb.	Dry Bulb.	Max. Tem.	Min. Tem.	Remarks
20	29·29	SW	47	51	57	45	Cloudy
21	29·54	W	48	52	56	45	Cloudy
22	29·85	W	48	50	64	45	Cloudy
24	30·06	SW	50	54	64	45	Dull
25	30·08	W	50	54	63	47	Cloudy
26	30·21	NW	46	51	—	43	Fine
27	30·02	SW	47	51	56	48	Dull
28	29·51	W	48	52	60	49	Cloudy
29	29·55	S	48	51	53	44	Cloudy
May.							
1	29·97	E	41	45	53	37	Cloudy
2	30·16	NE	40	44	50	35	Cloudy
3	30·30	NE	40	45	—	36	Cloudy

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THE BRITISH JOURNAL OF PHOTOGRAPHY.

No. 836. Vol. XXIII.—MAY 12, 1876.

ON THE REPRODUCTION OF NEGATIVES.

Various causes have recently combined tending to bring into greater prominence the process of producing duplicates of original negatives for certain special purposes, or, perhaps, it may be that the improved methods now in use are so much in advance of those formerly practised, and the results obtained so nearly perfect, that what was at one time considered as only practicable for the production of inferior work is now exalted to the rank of a necessary part of the manipulation where the higher classes of pictures are required. The principal branches of photography in which the reproduction of negatives is now found to be not only useful but absolutely necessary are the various processes of printing in permanent pigments, and also in some of the enlarging methods at present in vogue. In the former cases it frequently happens that, in order to produce a non-reversed print, a reversed negative becomes a necessity, while, in order to obtain the most perfect form of enlargement, a special negative must be prepared from the original one, which, though perhaps giving fine results when printed in the ordinary manner, is unsuited to the requirements of the enlarger.

The process of reproduction may be treated under three different heads—collodion, albumen, and bichromatised gelatine being equally applicable to the object in view. It is possible also that gelatine may be found to possess advantages of its own, and in special cases to be preferable to the others, but not having tried that method sufficiently we shall pass it over in the present article. The remaining three may be again subdivided into various modifications, so as to meet the particular requirements of individual operators or the production of negatives of special quality.

The oldest form of collodion process is, of course, the ordinary wet method, which, however, for the purpose under consideration is scarcely as useful as it is in other branches of photography. Circumstances may, perhaps, arise in which it is advisable to resort to its use, in which cases pyrogallic development will be found to give more satisfactory results than iron. A simply bromised collodion, or one containing a large proportion of bromide, also tends to the formation of a finer image and better half-tone.

In following this method two operations are necessary. The first is the production of a transparency from which, in turn, the negative is obtained. As the necessary copying will most probably be performed by means of the camera no difficulty will be experienced in producing either a reversed or non-reversed image as may be desirable, all that is required being to present the varnished side of the negative to the lens in the former case, and *vice versâ*. Another method consists in the use of one or other of the numerous forms of dry plates, the copying being performed by means of the camera, or by superposition in an ordinary printing-frame. The former plan will only be found necessary where the glass upon which the negative has been produced is of so uneven a character as to impair the definition of the image or to jeopardise the safety of the negative when placed under pressure; it will also be found useful where it is desirable to increase or diminish the original proportions of the picture. For all ordinary purposes printing by superposition will be found to answer admirably, and can be performed with but a little of the trouble involved in the use of the copying camera. The development will depend very greatly upon circumstances, as will also the character of the plate employed.

In order to obtain a non-reversed reproduction by the dry-plate method it is first of all necessary to prepare in the ordinary manner a transparency, which should, of course, be as perfect and free from defects as possible. Much may be done in the way of removing defects which exist in the original by touching out and working upon both the negative and the transparency, the effects produced in the two cases being directly opposite; thus, for instance, transparent spots should be "touched out" upon the negative, while opaque ones may be manipulated on the transparency, when they, of course, are rendered as transparent. By judicious development, too, an increase of harmony between the lights and shadows of the original negative may be attained; in fact, in the care and taste displayed in the production of the transparency lies the secret of success. If the original negative be of good printing quality, without violent contrasts and perfect in half-tone, the finest result will be obtained by the use of silver development; while, if the contrary be the case, alkaline pyro. gives far greater power in correcting defects or modifying the harmonious character of the picture.

If the reproduction be required in the reversed state it is not necessary to resort to the troublesome operation of transferring the film, though that may be done if preferred. The "chemical" process of reversal, consisting in the treatment of the developed image with dilute nitric acid, may be used, and this, in addition to the decrease in trouble, will diminish the chance of loss of definition arising from the double reproduction. To render this plan available it is a *sine quâ non* that simply bromised collodion be employed in conjunction with alkaline development. A slight trace of iodide of silver in the film would probably produce little or no ill effect; but it is almost certain that its presence could do no good, as it is doubtful whether the alkaline pyro. has any developing effect upon silver iodide even when combined with bromide. After exposure the transparency is developed by means of pyro. and alkali, the greatest degree of density compatible with harmony being aimed at; the object in view is the reduction of the whole thickness of the silver bromide in those portions of the film representing the deepest shadows, while the high lights remain nearly untouched. A slight veil, however, will not be found productive of any great injury—its only effect, if not too pronounced, being to diminish in an infinitesimal degree the thickness of the film of bromide left after treatment with the acid.

The development completed, the plate is well washed and treated with nitric acid diluted with two or three times the quantity of water; the silver forming the image is thus dissolved, leaving a picture composed of varying thicknesses of silver bromide, the deepest shadows being represented by clear glass. After washing thoroughly in order to remove the acid flow the plate over with an organifying solution, and, after a brief exposure to light, redevelope, when a negative representation of the picture will be obtained possessing all the delicacy of gradation of the original. A difficulty is frequently experienced in gaining sufficient density on the redeveloped image, arising chiefly from the imperfect removal of the

acid. This may be easily obviated by washing the film with a weak solution of alkali previous to the application of the preservative, or by rendering the latter slightly alkaline.

A favourite organifier for use in this process consists of a solution of albumen of the strength of one to twenty, with the addition of from fifteen to twenty drops of strong ammonia to each pint of solution. Another, nearly as good, is a solution of tannin, fifteen grains to the ounce, also rendered slightly alkaline. For the redevelopment either pyro. and ammonia or pyro. and silver may be employed—the latter, though slower in action, giving very fine results. Care must be taken, however, to remove all trace of alkali before allowing the silver to touch the film, or hopeless fog will result. It is needless to remark that the film does not require drying previous to exposure and development. For various reasons we recommend, as preferable to the above, the use of alkaline pyro., as, in addition to the greater rapidity of its action, it confers the power of rectifying an imperfect image. If, for instance, the negative be too dense or the opposite, or possess too harsh contrasts, it is only necessary to "chlorise" the image by means of cupric chloride and redevelope. It is not always easy to judge with certainty of the exact effect which will be produced; hence the chloride-of-copper treatment becomes frequently of the highest assistance.

Another method which may be classed under the head of collodion consists in printing direct by means of collodio-chloride. Though we have not ourselves experimented much in this direction, we have heard of, and seen, very excellent results thus produced. The chief difficulty in the collodio-chloride method lies in obtaining sufficient density, and, with some samples, in estimating correctly the extent to which the image will suffer from the lowering effects of the fixing bath. These, however, may be surmounted by practice.

As a sort of connecting link between collodion and albumen processes we may briefly mention the Taupenôt and similar formulæ; these, however, require the same general treatment as other dry plates. Albumen has long been known to conduce greatly to the beauty and fineness of the image; hence for purposes similar to the present it is peculiarly adapted. If chlorised albumen (prepared in a similar manner to that employed for albumenising paper, but containing a large proportion of chloride) be spread upon glass and sensitised in a silver bath of one hundred grains to the ounce, the plates, when dry, may be printed upon in the same manner as with collodio-chloride. Some transparencies produced in this way, which were shown to us several years ago, were among the finest we have ever seen.

We now come to the method which is, perhaps, the most simple in manipulation, and at the same time the most perfect in its results, of any yet mentioned. We refer to reproduction in carbon. Those who have been fortunate enough to have had an opportunity of examining the exquisite productions of M. Leon Lambert—especially his transparencies and reproductions of negatives by the contretype process—cannot fail to have been struck with the extreme delicacy and perfection of the results obtained; and though those results produced by a patented process may owe a certain portion of their excellence to the peculiarities of the process, and in the case of M. Lambert's specimens to the skilful manipulation of the artist, it is beyond all doubt that the very finest work is to be obtained with the assistance of bichromatised gelatine. The manipulation is extremely simple, and the materials may now be obtained of excellent quality and on very advantageous terms, so that neither on the score of trouble nor expense can objections be raised against the plan.

The carbon tissue having been cut to the required size is placed under the negative to be reproduced, and printed in the ordinary way, the negative being provided with a "safe-edge." After soaking for a short time in cold water the printed tissue is transferred to a piece of glass the surface of which has been covered with a film of insoluble gelatine, the two surfaces being brought into contact by means of the squeegee. After remaining for a few minutes under slight pressure the glass, with its adherent tissue, is transferred to a dish of warm water, when the picture is quickly developed and forms a beautiful transparency. After drying the transparency is substituted for the original negative and the operation repeated, the result being a reversed representation of the original negative, suitable for printing by the single transfer carbon process. If a non-reversed negative be required it is only necessary to develope either the transparency or the negative—it is immaterial which—upon a sheet of paper impregnated with india-rubber; the developed picture is then pressed into contact with a glass plate prepared as in the previous case and dried, when the transfer-paper may be removed by means of benzole. If pellicular negatives be required, instead of preparing the surface of the glass with gelatine, let it be waxed and coated with stout transfer collodion; the latter surface and the exposed tissue, both in the moist state, are brought into contact, and, when dry, the combined film may be stripped from the glass with the greatest ease.

A portion of M. Lambert's manipulations, to which much of the beauty of his results is attributable—though it does not come under his patent, having been introduced in 1868—is the method of intensifying the carbon image by means of permanganate of potash. If the developed image be wanting in vigour it is plunged, whilst still wet, into a weak solution of that salt, and, according to the strength of the solution and the length of the immersion, the density may be increased to any desired extent.

A NEW STUDIO.

It is just ten years since we gave a detailed description of a new studio erected by Mr. A. L. Henderson in the suburb of New-cross. One of the peculiarities of this studio consisted in the roof and side being sloped towards the end at which the camera was placed, so as to have the panes of glass interposed between the light and the sitter in a more or less direct position, because, as we have often remarked, the most perfect and powerful conditions of lighting are best fulfilled when the glass is placed at a right angle to the rays which illuminate the sitter. The studio at New-cross was found to answer so perfectly that Mr. Henderson, a considerable time since, determined to alter his glass room at King William-street so as to secure similar advantages; but, owing to structural and other architectural considerations, it was found inexpedient to effect the necessary alterations upon the old studio, and preference was given to a suggestion to have an entirely new one erected upon the same premises. This has now been done, and when we visited this studio a few days ago we found it opened and devoted to the purposes of business.

The new studio is somewhat small in dimensions, as it has been found that in glass rooms of moderate size the lighting is more under control than when the space covered is great and the roof lofty. To the principle of the sloping roof and sloping side effect is here given in a very complete manner.

The height of the background end is about seven feet six inches, but at the camera end of the "light" it is lower in the centre, and much lower still at the eaves. The only way by which we can convey a correct idea of the slope of the roof and side is to ask the reader to imagine he is standing inside of a ridge-roof studio, and that the end of the ridge nearest the camera has been depressed to a considerable extent so as to put the top of the ridge upon a slope downward from the background end. But this slope is not confined to the direction we have indicated, for the *side* of the studio containing the glass is also sloped away from the edge of the background in towards the camera. The result of this is that both the top and the side light fall upon the sitter after being transmitted through panes of glass much more directly interposed between the light and the sitter than would have been the case had the roof and sides been square.

The high side light upon the sitter comes from due north. The side is glazed up to the background, but the roof is opaque to within two feet. Four spring "capped" blinds protect the roof and regulate the admission of top light to a great nicety. The side light is also regulated by several opaque blinds. But without any blinds at all excellent modelling may be obtained—a fact for which we are able to vouch from a specimen before us, having had a portrait taken at the time of our visit.

Rembrandt effects are very easily obtained on account of the side light and a portion of the top light extending up to the

background. There is a corrugated glass reflector placed on the shadow side of the sitter, and this is protected by a white blind, which can be raised or lowered so as to regulate the reflected side light.

The camera end of the studio is so dark that a small operating room, constructed for occasional use, and the entrance to which is in the immediate vicinity of the camera-stand when *in situ*, can be used for the preparation and development of plates without the door being closed. This dark room, however, is only intended to be used in cases of emergency.

The studio here briefly described, and the width of which at the background end is twelve feet, is very effective, and during our examination of it we saw several excellent portraits taken in various styles of lighting.

"PHOTOGRAPHY MADE EASY."

The fortunate possessor of a complete copy of our own Journal or of others connected with photography, in which are recorded the rise and progress of our art-science, the wants and wishes of the early workers, and, especially, the often crude but frequently valuable suggestions of men of considerable inventive power but deficient in experimental ability, has an almost inexhaustible source of both instruction and amusement, from which he may pleasantly and profitably fill up many leisure hours.

Probably one of the first things to strike those who look carefully into the earlier volumes of this Journal is the fact that photographers are slow to take up and practically work out a new idea, although it may contain the germ of improvements of the utmost importance; and even in many cases it will be found that improvements recorded in a practical form have lain dormant for a considerable period, and were only taken up through the importunate iteration and reiteration of some one who happened to be a little more clear-sighted than the generality of his brethren.

A good example of the small importance attached to the first promulgation of a great idea is to be found in the discovery that made carbon printing in half-tone possible. The uncomfortable fact that silver prints were liable to fade quickly turned many a longing eye to carbon, and zealous experimentalists, both at home and abroad, went to work with a will that should have been all-prevailing; but until the late Mr. W. Blair, of Perth, showed the necessity for printing and developing on opposite sides of the tissue their highest efforts resulted only in work in line, and even some of the most enthusiastic workers were beginning to despair of ever being able to do anything else. And yet years before Mr. Blair's publication of the cardinal fact Mr. C. J. Burnett, of Edinburgh—to whom photography owes much, and whose contributions we have long missed—uttered the prophetic announcement that carbon prints in half-tone would never be produced till the printing was done on one side and the development on the other.

Another example of how long a valuable idea may remain unfruitful is to be found in connection with the now popular family of emulsion processes. On recently glancing over our volume for 1861 we found in a sub-leader, at page 158, a statement that Capt. Dixon and Mr. Samuel Fry were engaged in maturing the details of a process for producing a sensitive film on glass without the aid of a bath of nitrate of silver or any other substance, and that such film was to be produced at one operation by means of a preparation poured on the plate. Here, surely, was a tolerably clear hint, and yet it remained unheeded for more than three years, until 1864, when Messrs. Sayce and Bolton took up the matter with a zeal which led to success, the result being that it is now, for landscape purposes, the most popular of all photographic processes.

Probably no process in connection with the art has received more attention than the one to which we have last referred, and to none certainly has it been better applied, the result being, as our readers are aware, that plates may be prepared by it rivalling wet collodion in sensitiveness and quite equal to collodio-albumen in certainty. Now to the great mass of our readers this is well known, as well as the protracted experiments and long discussions which took place prior to arriving at the results. But we are aware that there are not a few who, having little time to spare, are still anxious to take advantage of the approaching season to bring home reminiscences of scenes where holidays are spent, but who may be deterred from gratifying the desire by the supposed difficulty of preparing plates of good quality, or discouraged in consequence of the conflicting testimony regarding the various methods of forming the emulsion. To all such the washed emulsion, as we have frequently pointed out, offers every possible advantage, and will with the minimum of trouble give perfect results with, perhaps, greater certainty than can be attained by any other method.

For those who prefer to purchase, rather than make, their emulsion we can say, with confidence, that the commercial emulsion now supplied is in every respect satisfactory, and that when the right exposure is given it is capable of giving negatives quite equal to those by any other process, not excepting wet collodion even in the hands of the best workers. To those, however, who prefer to manufacture for themselves we may say that the production of a suitable emulsion is a very simple matter; and to save them the trouble of searching through the writings of the last year or two with a view of arriving at a suitable formula, we shall briefly indicate the method by which the emulsion we are at present using was made, and which leaves little to be desired, premising that certainty more than sensitiveness was the object sought to be secured, although it requires less than half the exposure necessary for beer-and-albumen plates, for which we have long had a predilection.

Much has been said about the necessity of a suitable pyroxyline for emulsion work, and not without cause, so far as ordinary emulsions are concerned; but for a washed emulsion there appears to be more latitude in the selection. Almost any sample that has been made with weak acids at a high temperature will do; but we prefer that made from the raw cotton with all its usual impurities, and which has been many times recommended in our columns. This we dissolve to the extent of eight grains per ounce in a mixture of one part of alcohol and two of ether. This is allowed to stand till quite clear, and then to each six drachms is added—

Bromide of cadmium	6 grains,
Bromide of ammonium	3 ,,

dissolved in two drachms of alcohol.

To each ounce of this we add in the usual way eighteen grains of nitrate of silver dissolved in two drachms of boiling alcohol, and shake at intervals for twelve hours. At the expiration of that time three drops of *aqua regia* are added and twenty drops of a thirty-grain alcoholic solution of tannin, and the whole poured into a dish to set. When it is firm to the touch it is broken up into pieces and covered with water containing a little acetic acid. Of this it gets some six or eight changes, and is then loosely wrapped in muslin, placed in a funnel, and a stream of water allowed to flow through it for an hour. The muslin is then pretty firmly squeezed, and the mass broken up and laid on a plate of glass, or spread on the bottom of a porcelain tray and dried in the box we formerly used for ordinary plates. When the water is entirely driven off the pellicle is dissolved in equal parts of ether and alcohol to the extent of about fifteen grains to the ounce, and is then ready for use. This emulsion will keep indefinitely; and, although not rapid, as modern ideas go, it is sufficiently quick for all ordinary purposes.

For those who desiderate "photography made easy" nothing can be simpler. We have now before us two negatives developed a few hours ago, which were exposed eleven days before development, and there is no visible difference between them and some that were developed four hours after exposure. As the latitude of exposure is considerable anyone with an eye to the picturesque, and who can master the coating of a plate, may secure for himself and his friends reminiscences of his holiday trip, although altogether ignorant of photography.

To the experienced landscapist "photography made easy" should be no less welcome. The only *impedimenta*, in addition to his camera and tripod, is a box of albumenised plates, a bottle of saturated solution of carbonate of ammonium, one of alcoholic pyrogallic acid, one of bromide of potassium, and one of emulsion. At night he can coat as many plates as he requires for the morrow's work, and they will

be dry enough to put into his slides or changing-box in a few minutes; then he may develope on the following evening, and leave the fixing and, if necessary, the intensifying till his return home. Whatever the merits of other processes may be we are certain of this—that only slight experience is required to convince those who have little time to spare, and who desire to make good negatives with the smallest possible amount of trouble, that washed emulsion is the right thing for them.

RECENTLY PATENTED INVENTIONS.

No. IX.—SLINGSBY'S IMPROVED STUDIO.

We look upon it as a healthy sign when patents are being taken out for various forms of studios, as it shows that interest is felt in the subject of the best and most efficient means by which to light the sitter. To the professional photographer the glass room is a subject in which, more than any other, he is deeply concerned; for upon its situation and construction depends the quality of his work both in respect of light and shade, and also in the ability he should possess in producing a portrait without so unduly protracting the sitting as to interfere with the expression. An able writer* has observed that while a photographer can obtain chemicals, lenses, and cameras of excellent quality from dealers of repute, he must, in the construction of the glass room, depend to a large extent upon himself, acting under such information and instruction as he can obtain. "It is certain," he says, "that a very clever operator will occasionally obtain good pictures in almost any glass room; this is not, however, what is wanted. The disposition of light should be such as to facilitate to the utmost the really difficult task of regular success." With the correctness of this observation no one will be inclined to disagree.

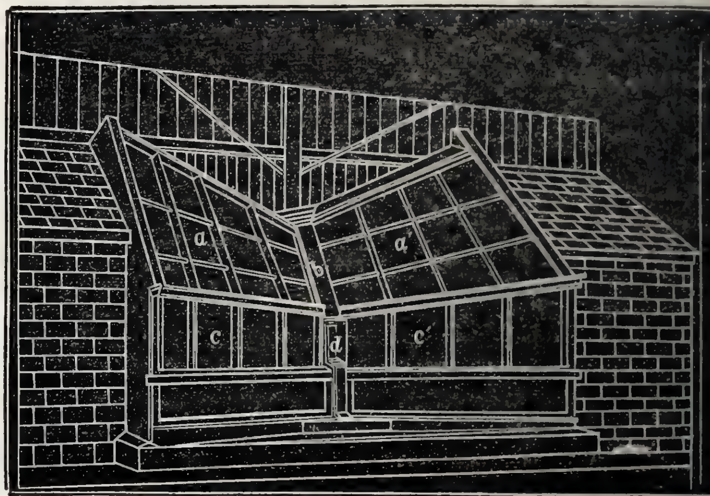
It is only recently that we gave a detailed description of a studio—or, more correctly, a method of lighting a studio—in which the arrangement of the panes of glass was such as to permit the light to pass through them at a right angle, or nearly so; that is to say, the panes were directly—not obliquely—interposed between the sitter and the source of light. This, we may observe, is one of the primary principles recognised in the transmission of light; for it is a well-known fact in physics that the amount of reflection, and consequent loss of light, depends upon the obliquity of incidence—a plate of glass interposed obliquely between the radiant and the sitter reflecting away far more and transmitting far less of the light than would be the case were it interposed directly instead of obliquely. This principle has been recognised in all recent endeavours to improve the lighting of photographic studios.

A patent has recently been obtained by Mr. R. Slingsby, of Lincoln, for a method of constructing studios in which the principle of directly interposing the glass of the studio between the sitter and the source of light is recognised. In several studios this principle is thoroughly acted on to this extent, at any rate—that in some the sides are made to slope inwards towards the camera, and in others the roof is made to slope in a similar direction. In the patented studio of Mr. Slingsby both the roof *and* the side are sloped. His "invention" consists in constructing the "sky light," as well as the "side light," of a photographic studio with a double pitch or inclination inwards from the two ends to the middle of its length, where the two inclined or sloping surfaces meet at an angle of about 120 degrees. The "sky light" and "side light" are thus virtually divided in their length at this inwardly-projecting angle into two halves, through either of which a greater amount of light is admitted from one direction to the adjacent end of the studio than through a sky light and side light of the ordinary straight construction of nearly double the length, the light passing in an unbroken direction towards the sitter through the whole of the nearest half of the sky light and side light.

By reason of the double inward pitch or inclination of the sky light and side light, the above-mentioned advantage is secured at whichever end of the studio the sitter may be placed, both ends of the studio being lighted equally well. The position of the two portions of the side light and sky light relatively to the sitter is such that the portion of the side light and sky light which illuminates the opposite end of the studio is edgewise towards the sitter, and, therefore, not visible to him. The whole of the glass, through which the light reaches the sitter being at almost the same distance from and altogether near to the sitter, the time required for exposure will be shortened considerably.

* Mr. M. Carey Lea, in his *Manual.*

The following drawing represents an external elevation of the side light and sky light of a studio constructed according to Mr. Slingsby's patent; and we may here observe that accompanying the specification there is also an internal perspective view of the same, which we do not consider necessary to engrave in order to elucidate that gentleman's idea.



The skylight, instead of being straight or in a single plane sloping downwards from the top to the eaves of the roof as usual, is constructed with a slope of about thirty or forty degrees inwards or downwards from each end to the middle of its length, besides sloping downwards to the eaves of the roof. The skylight is thus composed of two similar parts or halves a, a^1, which are sloped or inclined as above described, and meet at b at an angle of about 120 degrees to one another. The side light is also composed of two parts c, c^1, of equal length, which are inclined inward and meet at d, and stand at an angle of about 120 degrees to one another.

The lowest and highest points of the sky light at the middle of the studio should be respectively about six feet and ten feet from the floor of the studio. The sitter is lighted by the nearest halves only of the sky and side lights which face towards him, the other halves which face the other way being radial to the sitter, and therefore invisible to him, and are used only when the position of the sitter is changed to the opposite end of the studio.

Instead of the sky and side lights meeting at an angle at b and d, as above mentioned, they may be separated a few feet by an unglazed or darkened portion of straight roof and side, under which the camera may be placed in comparative obscurity.

By means of this double inward pitch of the sky and side lights the studio is lighted equally well at either end, a greater amount of light being admitted in the direction of the sitter through either half of a sky and side light having a total length of ten feet, constructed according to this invention, than through a light of the ordinary straight construction twenty feet in length.

The arrangement and construction of the frames and sashes will be evident from the drawing and readily understood without description, and, moreover, may be varied according to circumstances.

Instead of the side light being vertical it may be sloped outward from top to bottom, the sky light being at one slope and the side light at another slope; or they may both be at the same slope and combined in one in the form of what is known as a "Mansard" roof, but with the double pitch or inclination inwards at the centre, as will be readily understood.

The following are the definite claims made by Mr. Slingsby:—
1. Constructing both the sky light and the adjacent side light of a photographic studio with a double pitch or inclination inwards towards the centre (in addition to the ordinary inclination of the

sky light downwards towards the eaves), substantially as and for the purpose shown and described. 2. The modifications in the construction of the sky light and side light herein specified. 3. The application of one-half of the sky light and side light constructed as herein set forth to a studio in which the sitter is always placed at the same end, substantially as specified.

In an article in another column Mr. M. Carey Lea makes the first attempt we have noticed in the direction of an explanation of the difference in the behaviour of silver bromide when formed in collodion and gelatine. In doing so he touches upon a point which has never, at least in connection with sensitiveness, called for any attention. That Mr. Lea's surmise as to the fineness of the precipitate of silver bromide is to some extent correct we have not the slightest doubt. Though it never previously struck us to look at the matter from that point, many facts may be brought to bear upon the subject, all tending to strengthen the supposition. It is well known that one of the tests of the working qualities of an emulsion, short of absolutely developing a plate, is the colour of the film by transmitted light. Now, if the richest-looking films be closely examined, they will be almost invariably found to be the finest in texture; that is to say, the bromide is precipitated in a state of finer division than is the case with less perfect films. Then, again, an emulsion formed from a pyroxyline of a particularly "skinny" nature will require a much longer time to sensitise than another made from a more powdery sample, and the film will be finer in the grain and more transparent as regards mere appearance; as to photographic properties the more viscous emulsion will be found the *more sensitive*, while the other will give the *denser image*. In our experience with washed emulsions we have found that the larger the proportion of pyroxyline to the silver bromide in the pellicle the greater will be the sensitiveness, provided the conditions of preparation have been the same. The emulsions containing the larger proportions of pyroxyline will exhibit less tendency to subside, thus showing a finer state of division. A very sensitive emulsion is formed by following the plan recommended, we think, by Mr. W. J. Stillman, and consisting in a gradual sensitising by alternate additions, extending over a considerable period, of bromide and silver. By this means the combining salts are presented to one another *in much weaker solution* than in the ordinary method, and therefore in a more favourable state for producing fineness of deposit. As regards the change of state of a precipitate after its first formation, there can be no doubt that such change is possible; but in the case cited by Mr. Lea—the "crystallisation" and re-emulsification of silver iodide—we cannot attribute the result to any spontaneous action, but rather to the progressive action of the mutually decomposing salts in the emulsion. In conclusion: we may add another possible reason for the greater sensitiveness of gelatine emulsions, and that is the greater absorptive power of the gelatine, which not only permits, but compels, so to say, the developer to penetrate to every portion of the film.

Her Majesty the Queen will tomorrow make a formal inspection of an assemblage of scientific treasures the collection of which has for a considerable period engaged the attention of many of our ablest *savants*, after which, on Monday next, "The Special Loan Collection of Scientific Apparatus" will be thrown open to the public. This exhibition has been organised by the Committee of Council on Education, and we need scarcely observe that it is to be held in the Exhibition Buildings, South Kensington. We have paid a hurried visit to the building while as yet many things have not been received or properly arranged; but we can see that the collection is of considerable magnitude and importance, and will necessarily prove of great value. It is to be open to the public, free of charge, on Mondays, Tuesdays, and Saturdays, from 10 a.m. to 10 p.m.; and on the other days of the week from 10 a.m. to 6 p.m. at the very moderate charge of sixpence. The collection comprises ancient and modern pieces of apparatus in connection with astronomy, geology, biology, meteorology, and, need we say, photography, as well as several other of the applied sciences. At present we are not in a position to indicate with sufficient precision the nature of the treat in store for lovers of science; but in our next, after the various articles have been received and properly placed and the exhibition duly opened, we shall give an account of those objects which we consider will prove interesting.

SOME SUGGESTIONS ON THE CAUSE OF RED FOG IN GELATINE PLATES, AND ON THE CONDITIONS OF SENSITIVENESS OF SILVER BROMIDE, &c.

In some very brief remarks on the subject of gelatine emulsions, sent some time since to this Journal, I spoke of the difficulty which, in common with many others, I had experienced with *red fogging*—an annoyance which somewhat disinclined me to further experiments with this process; not that this trouble was impossible to obviate, but that the marked tendency to it which manifested itself seemed to turn the scale in favour of collodion, if, indeed, collodion did not deserve the preference for many other reasons. I have been lately asked for any suggestions which I could offer on the subject of this red fog, which appears at times to trouble all those who work with gelatine emulsions. My experience with this form of emulsion has not been sufficiently extensive for me to hope to offer much aid; I shall be glad, however, to give any in my power.

There is no doubt that gelatine has a very peculiar action on the silver haloids, differing essentially from that of collodion. One proof of this lies in the fact that emulsions made with gelatine need no accelerating applications, but exhibit a high degree of sensitiveness without them. Doubtless the *wonderfully fine division* that gelatine causes in any precipitate made in its presence has much to do with this; the finer the division of any given mass the greater the surface exposed to external action. We see this in endless cases in chemistry, perhaps in none more conspicuously than in that of metallic *lead*, which, when a sufficiently fine powder, takes fire by mere exposure to air (as, for example, when reduced by heating lead tartrate). Doubtless the size of the particles of silver bromide has a direct relation with its sensitiveness in all cases, and as this matter of size may be influenced by the most trifling circumstances it becomes impossible to define or fix the abstract sensitiveness of silver bromide. If, for example, an emulsion be prepared, and then a second under precisely the same conditions but with a little more of the same pyroxyline, this last, simply by rendering the collodion more viscid, will necessarily render the precipitate finer, and so increase the sensitiveness. We may say, for example, that lead has a certain definite affinity for oxygen; but this is so little manifested under ordinary circumstances that a freshly-cut piece of lead will retain its brightness for many days. When, therefore, we find that lead reduced to a very fine powder exhibits so powerful an affinity for oxygen as to become red hot and glow by mere exposure to the air, we see what an enormous influence mere mechanical conditions may exert. In this comparison we have, I am persuaded, the key to many variations of sensitiveness of silver preparations.

But there is another fact closely connected with this which, when I state it, will, perhaps, be received with doubt. It is that the original condition of a precipitate of a silver haloid is by no means necessarily permanent. Under favourable conditions a precipitate of a given degree of fineness may become either more finely or less finely divided than at first.

That a precipitate may become less fine and more granular by standing is a fact familiar to chemists, and frequently seen. The converse case is comparatively unknown, but it may be brought about by reversing the conditions that tend in the opposite direction. When a precipitate becomes coarser and more granular it is always a result of *crystallisation*. When a precipitate originally crystalline can have its crystalline character destroyed or diminished it may become finer than when first formed.

This effect I have many times seen presented with silver iodide. Silver iodide, when first precipitated from an emulsion, is very apt to be crystalline, and when this is the case it is formed in grains large enough to be separately visible to the eye, and sinks at once to the bottom. A moderate amount of shaking destroys this crystalline character, the crystals break up into fine powder, and the emulsion becomes as complete and as uniform as that of silver bromide. Now, although a similar change is not visible in the case of silver bromide, it is, at least, possible that it may also take place in the case of that compound, though to a much less extent.

These facts, whilst not offered as affording a complete explanation of the different conditions of sensitiveness of silver bromide, nevertheless seem to go far towards it. They do not explain everything; for I hold this matter of fineness of division to be only one out

of several factors, though a most important one—perhaps the most important.

To return, however, to the gelatine emulsions. Over and above this matter of fineness of division there is a peculiar action that takes place on the silver haloids in the presence of gelatine. There is a greater tendency to irregular reduction, particularly shown under special circumstances. More than a year ago, whilst examining the sensitiveness to different rays of light of the silver haloids, I was struck by this fact—*that, although with silver iodide formed on paper and silver bromide similarly formed I could develope clean images with gallic acid and silver, yet when the two, iodide and bromide, were present together, I always got more or less fog.* This I have been disposed to attribute to the gelatine in the sizing, but did not stop to investigate closely the point, having too much else in hand. If I recollect rightly, no bromide was ever added to the iodide in the calotype process, and the above, I think, is probably the explanation.

I have also been asked to suggest any probable remedy for the red fog. This I somewhat hesitate to do, not liking to make suggestions that are not based on actual trials; but the experiments which I published in the columns of this Journal some time since, on the effects produced by varying the different constituents of the alkaline developer in the case of collodion emulsions, seem to suggest that gelatine emulsions could be best treated with a developer containing all three agents—pyrogallol, bromide, and carbonate—*previously mixed,* rather than by beginning with pyrogallol in the usual way. Where there is absolutely no danger of fog—as in a well-managed chloriodo-bromide or chloro-bromide collodion emulsion—it is best to begin with pyrogallol separately; but in all cases where fog is dreaded the three constituents should be used together, and I presume that with gelatine emulsions this would be the best course to adopt. Also, to keep down the amount of pyrogallol. I had not an opportunity of testing these plans, because my experiments with gelatine emulsions were terminated before those with the developer above mentioned were begun.

On the subject of the influence of fineness of division on sensitiveness I find that I shall not be able to conclude my observations in this communication, but shall hope to do so next week. The subject is one which, if I am not mistaken, will be found to have a wide application and a great significance in photo-chemistry.

M. Carey Lea.

FOREIGN NOTES AND NEWS.

The *Agenda's* Patriotism.—A Vander Weyde Studio.—A Sugar and Potassic Iodide Process. — The *Photographischen Monatsblatt.*—Dr. Vogel's Reply to Captain Abney's "*Note on the Photographing the Least Refrangible Rays of the Solar Spectrum.*"—M. Husnik's Photo-Engraving Process.—Formula for Blacking Brasswork and for Clearing Shellac Varnish.—An Economical Printing Bath.

A German paper points out that amongst the miscellaneous information given by M. Vidal's *Agenda* Alsace and Lorraine are still put down as French departments, the Franco-Prussian war being ignored, and the Prussian money is said to be thalers and groschen, no mention being made of the new mark standard. We will charitably suppose that these errors have crept in, if they exist, by an oversight; but, whether or no, they will be forgiven, since they have no immediate connection with matters photographic, of which the *Agenda* is supposed to treat.

The *Photographisches Archiv* says that Herr Petersen, of Copenhagen, has just built a new glass house on the Vander Weyde principle.

The same journal quotes a passage from the *Chemisches Central Blatt,* which says that a dissolved mixture of sugar and potassic iodide becomes yellow on being exposed to the light, so that if strips of starched paper saturated with this solution be prepared in the dark and exposed under a negative, a positive will be obtained which may be fixed by washing it well with water. It is significant that nothing is said by the *Archiv,* nor seems to have been said by the *Chemisches Central Blatt,* as to the quality of these pictures.

The first number of the organ of the Photographic Society at Frankfort-on-Maine has just been published, but has not yet come to hand. It is called the *Photographischen Monatsblatt.*

Captain Abney's communication to the Photographic Society of Great Britain, published in The British Journal of Photography of the 24th March, has called forth a reply from Dr. Vogel in the current number of the *Mittheilungen,* in which he says:—

"In a recently-published article, in which he speaks of my labours in reference to the sensitiveness of bromide of silver in the presence of various dyes, Captain Abney says he has found a resin (which he does not name, and about the nature of which there can consequently be no discussion) which, when added to bromised silver collodion, renders the latter sensitive to the red part of the spectrum. He expressly asserts that with an exposure ten times as long as was required to take the blue rays alone he photographed the spectrum as far as B, and with an exposure twelve and a-half times as long he photographed as far as the line A. Here I would remark that I have obtained the same result upon pure bromide of silver (bromised collodion prepared in a pure silver bath and washed), having photographed the spectrum with it as far as the ultra red, and that without using a longer exposure than Captain Abney's. From that one may, therefore, infer that the resin can only have increased the sensitiveness of the bromide of silver for the less refrangible rays in a very slight degree. On the other hand, according to my experiments, the addition of certain dyes increases the sensitiveness of bromide of silver and chloride of silver to red and yellow to such a degree that I can photograph the yellow and orange of the spectrum at the same time as the blue, and, more than that, chloride of silver stained with napthaline red is *more sensitive to the yellow of the spectrum than to the blue.* This was also observed by Captain Waterhouse to be the case when bromide of silver is stained with eosin. This extraordinary increase of the sensitiveness of bromide of silver to red and yellow by means of the addition of *dyes* cannot, therefore, be accounted for by the *slight* increase of sensitiveness to the less refrangible rays induced by resin, as observed by Captain Abney. And it seems to me still more rash to wish to attribute the increased sensitiveness of my stained plates to the formation of organic silver salts. Compounds of bromide of silver with resin are as yet unknown, and Captain Abney's experiments afford no explanation of them. If, however, the increase of sensitiveness for the less refrangible parts of the spectrum take place in exactly the same places as the lines of absorption of the dyes added; if, moreover, as with chlorophyll (which shows several lines of absorption) the photographic action be distinctly stronger in several places; if, finally, as I have lately found, substances which destroy the absorbing power of the eosin (such as a little acid) be added to the eosin its sensitising action is immediately suspended, as described by Captain Waterhouse, then the conclusion that there is a connection between the power of absorption and the chemical action forces itself upon every attentive inquirer. My explanation of the chemical action of the colour upon bromide of silver rests upon this connection. This was demonstrated before me by means of numerous facts, by inquirers such as Herschel*, Draper, Schultz-Sellack, &c., and is considered by all German physicists as an established principle which has only received from my labours a further confirmation and a wider application. Captain Abney seems to be unaware that in expressing his opinion in these words, 'To me it seems natural that they should be most sensitive to those rays which they can *transmit,*' he flies in the face of this long-recognised principle. It is to be regretted that almost all those who have repeated my experiments have contented themselves with photographic tests, without at the same time studying diligently and exactly what has already been long published concerning the appearance of absorption and its connection with chemistry."

M. J. Husnik employs the following formula for the production of engraved plates by means of photography. It is based upon the use of bichromatised gelatine, the necessary grain being given by chloride of calcium. The formula consists of—

Gelatine	24	parts.
Bichromate of ammonia	4	„
Alcohol	72	„
Chloride of calcium	4 to 5	„
Water	240	„

This is spread upon glass or other suitable support, and after exposure and washing is used for the production, by the galvanoplastic method, of a plate, from which the prints are "pulled" in the usual manner.

The *Bulletin Belge de la Photographie* gives the following as a good and convenient method of blackening brass surfaces for photographic purposes. The metal, having been thoroughly cleaned, is brushed over with a solution of bichloride of platinum, known as

* See Hunt's *Researches on Light,* 1854, § 350.

"chemical bronze." If one or two drops of solution of nitrate of silver be added to thirty cubic centimetres of the platinum solution its action is considerably augmented. For clarifying solutions of shellac, the same journal recommends the addition to the varnish it is required to clear a quantity of powdered chalk equal to the weight of lac used. After thoroughly mixing, and heating to sixty degrees, the mixture is allowed to settle, when three-quarters of the bulk may be poured off perfectly clear, or, if necessary, it may be filtered with the greatest ease.

M. D. Ratti in the *Revista Fotographia* gives the following as an economical printing bath producing excellent results:—

Nitrate of silver	40 parts.
" ammonia	40 "
White sugar	40 "
Water	1,000 "

The best description of paper to use with this solution is one very lightly salted, about two parts of salt to 1,000 of albumen being the strength mentioned by the author; the toning and subsequent operations are the same as those in general use. After the solution has been once used it is shaken up with ten drops of washed animal charcoal, which is allowed to remain in the bottle in order to keep it colourless. It is strengthened from time to time by the addition of a due quantity of similar solution but containing two and a-half times the proportion of silver.

A FEW NOTES ON DRY-PLATE PHOTOGRAPHY: BATH *VERSUS* EMULSION.

[A communication to the West Riding of Yorkshire Photographic Society.]

At the request of many members of the Society I have jotted down a few notes in connection with my method of preparing dry plates by a bath process which has been a great favourite with me, and also by the Liverpool Dry-Plate Company's emulsion. My experience in connection with dry-plate photography extends over a period of something like twenty years, working pretty nearly every summer one process or other by the dry method.

Amongst all the bath processes I have worked I am inclined to think the tannin process the most simple and certain. One great thing in its favour is the quick and easy development of the plates; and this is of great and vital importance, especially to a beginner, as it is a well-known fact that there are more negatives spoiled in dry-plate photography by want of skill in development than by any other fault. That is the reason why I recommend this process to the novice in dry-plate work, as being the one in which he will be most likely to succeed in his first attempt at dry-plate photography.

In many hands the tannin process gives chalky negatives; but if the collodion only contains sufficient bromide that should not necessarily be the case. However, I found, after trying several bromo-iodised collodions in the market, that Mawson's ordinary negative collodion, with two grains per ounce of dried bromide of cadmium added some two or three days before using, to be the best I could procure.

I will give you an outline of my method of preparing tannin plates, which varies a little in detail from the original formula by Major Russell. A few examples, taken by my modification of the process, I shall hand round presently. They embrace rather difficult subjects, such as a deep glen or a badly-lighted rivulet in a wood bottom. I first coat the plate with albumen:—

Albumen	1 ounce.
Water	20 ounces.
Ammonia	1 drachm.

Beat well up with a fork in the usual way, filter, and add the ammonia. I generally make a large quantity at once—in fact, as much as will last me two or three years—and from time to time I add a little ammonia to make it keep. I find it improves wonderfully with age. When it is old it flows over a clean glass plate as even as collodion, without running in zigzag lines, as it usually does when new. However, if it have a tendency to do this I pour a pool of albumen on to the centre of the plate, and then with a flat camel's-hair brush, two or three inches wide, spread it all over the plate. As soon as I have got the plate wetted all over with the brush I pour on some more, which now flows evenly enough in consequence of the plate being wet all over. I now run the lot back into another bottle, in the neck of which a funnel is placed with a little plug of cotton wool in it. By this method I have my albumen nice and clear for every plate, and also have the back of the plates free from albumen stains. I have tried the method of coating while wet under the tap, but do not like it as well as this, on trial of which it will be found to be quite easy to manipulate. Dry quickly before the fire or in a drying-box.

Coat the plate with the collodion before mentioned and let it well set; then dip it into the silver bath, which may be slightly alkaline and kept well up in strength:—

Silver	45 grains.
Distilled water	1 ounce.

Let it stay in the bath at least ten minutes, of course raising the plate a few times in the usual way. If your collodion be in proper condition you should have a rich, thick, creamy film. Now have ready four or five dishes or baths. Let the first dish contain distilled water and a little acetic acid, say—

Water	2 ounces.
Glacial acetic acid	1 drachm.

I prefer this method to having an acid silver bath. The other three or four dishes may contain ordinary tap water. Pass the plates, as you go on preparing, from dish to dish; finish them off by rinsing well under the tap, and finally with a little distilled water. When you have got all your dishes full—of course if they are small plates you can put several into one dish—now commence with the preservative:—

Tannic acid	15 grains.
Water	1 ounce.

Filter bright.

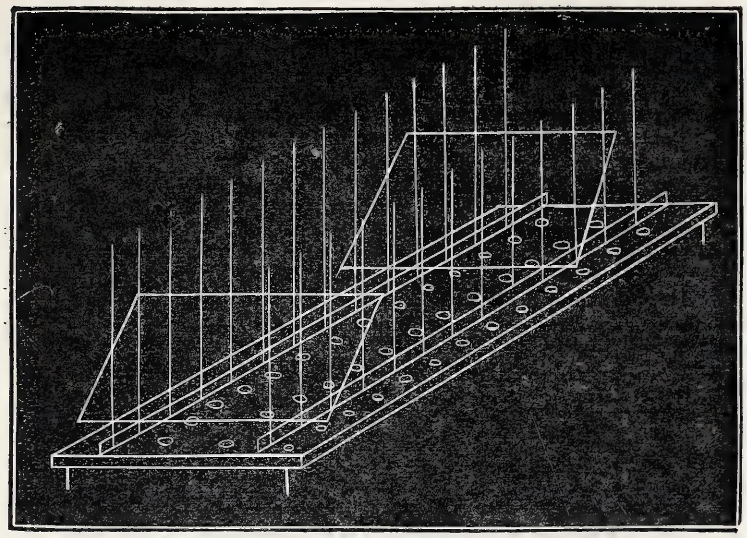
Then pour into each of two developing cups as much of the preservative as will cover the plate. Now take one of the cups and flow over the plate, taking off the water with it; drain slightly, and then take the other cup and pour on the next dose nicely and evenly, and let it stand on the plate about two minutes; then run that back into the developing cup, and use it for the first dose for the next plate; now drain, and then place in the plate-rack. When the rack is full put the batch into the drying-box.

My plate-rack consists of a small board fourteen inches long and about six inches broad, with two rows of strong iron wire driven in about nine inches high and two inches apart, and coated well with shellac. Along the bottom I lay two long strips of glass edgewise up, and about half-an-inch wide, for the plate to rest on. This rack holds six 12 × 10 plates, just fitting my drying-box, which is something like an ordinary magic lantern in design, only much wider. Along the bottom of the drying-box I have a pipe, perforated with a number of small holes, both ends of this pipe terminating outside the box with a bell mouth; this is for a proper supply of pure fresh air. The box stands on legs just high enough for one of the ordinary Bunsen burners, or, better still, one of the popular gas stoves used for boiling kettles. The latter do not stand above two or three inches high, and are very handy, being placed under it, by which means the air in the box is heated and passes off up the chimney on the top of the box, like a lantern. This is the most perfect piece of apparatus I have ever had constructed for drying plates. The idea I originally got from an article in The British Journal of Photography some years ago, by the Rev. Canon Beechey, who had one constructed for his own use by Messrs. Rouch and Co., of London. It answers perfectly, the plates being in a current of pure, dry air. With one of the ordinary gas stoves I can keep up a nice temperature of about 140 degrees, which answers admirably both for bath and emulsion plates. But I must not omit to mention that the board of my plate-rack is filled with small holes, to allow the passage up between each plate of a sufficient quantity of fresh air from the perforated pipe beneath it. My box is made of thin sheet iron, but I should think tin or zinc would answer. However, I strongly recommend every worker in dry-plate photography to have something of this kind constructed; that is, if he wish to dry his plates evenly and free from drying-marks and dust.

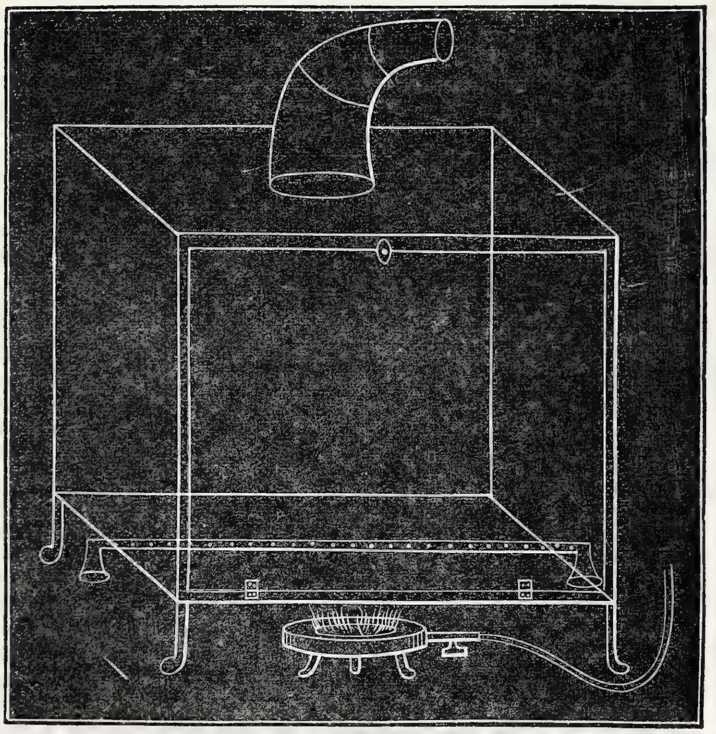
If the box be only for small plates—such as stereo., or even up to 8 × 5—one of the tin biscuit boxes from the grocers will do. Make a plate-rack to fit it, and partially cover it at the top, leaving, of course, room enough for the moisture to escape. If it be in the evening when you are preparing your plates—as is usually the case with amateur photographers—light a spirit lamp, which place under the box at a sufficient distance from the bottom to obtain the requisite amount of heat, and let there be just sufficient spirit in the lamp that you know will burn long enough to dry the plates, which can be going on all right after you have gone to bed, and well on to sleep—perchance dreaming of achieving great things with these selfsame plates which you have been so carefully preparing. These drying-boxes I find answer admirably both for albumenising the plates and also varnishing the finished negative. They are more free from dust than a fire, and very often more convenient. I have made a rough sketch of my rack and drying-box, so that the members may better understand me.

Of course this process, like all or most of the dry processes, can be worked much quicker by the strong alkaline development than by the old method with pyro. and silver. However, my best results

Plate-Rack.



Drying-Box.



have been made by the old method as originally introduced by Major Russell, "which is about six times as slow as the wet."

For the development mix the following solutions:—

Solution A.—	Pyrogallic acid	96 grains.
	Absolute alcohol	1 ounce.
,, B.—	Nitrate of silver	15 grains.
	Citric acid	20 grains.
	Water (acid)	1 ounce.

More of the ~~water~~ in summer. See next no p 240.

Take ten drops of solution A, which represents about two grains of pyro., in distilled water one ounce. This is for a 12 × 10 plate. The pyro. is best measured by one of Chalk's dropping-bottles procurable at the establishments of most druggists. They are much used for medicinal purposes, and are the best of all the many forms of dropping-bottles in the market. With this two-grain solution of plain pyro. flow the plate—of course after having carefully wetted it all over with distilled water. If the plate have been timed all right in the exposure—and there is a great latitude in that—the image will partially appear, but in some instances no trace of the image appears at all with plain pyro. However, be careful in adding silver. Begin by dropping one drop of solution B into the measure containing the plain pyro., which starts the development immediately it is poured on the plate. Add no more of solution B until every particle of detail is out; but if it refuse to come out, from under-exposure, flow the plate with hot water; also, mix the next dose of pyro. developer with hot water, and flow the plate again. In many instances, by raising the temperature in this manner, you may get out the detail, when by the ordinary method very little would appear at all. When you have got out all the detail the intensity rapidly progresses on the addition of a few drops more of silver solution B, which must be added very carefully a little at a time. Fix in the ordinary way with—

Hyposulphite of soda	1 ounce.
Water	6 ounces.

If you should have to intensify again after fixing—which is very often the case with me—wash the plate well under the tap; then flow it, while wet, with a weak solution of tincture of iodine in water till it is about the colour of sherry; then wash, and re-intensify with pyro. and silver as before. By this method you prevent stains, which, in many instances, occur when intensifying after fixing with hypo. Before adopting this method I found my negatives change colour very much indeed, and were also subject to stains. Very often the colour was a very non-actinic yellow. There are one or two examples, by both methods, which I will pass round for the inspection of the members. In many instances, if I could only have had the colour without resorting to the re-intensifying process it would have been sufficient.

I have very little more to add in connection with this process. I have no doubt many of you will say that it is old; that I have communicated nothing new or of much importance; and also that it has been superseded by others which are better. However, give it a trial, and I will be bound to say that you will succeed with this dry process when you may have failed with many others. When I began to jot down these few notes I intended to give a general *résumé* of various processes with which I have succeeded in producing good results; but on sitting down to make the notes I found that one has so much to say about each individual process and his own special manner of working it, explaining minutely every little dodge which he picks up as he goes along in his study of dry-plate photography, that I found my notes would become too extended.

There is another bath process to which I fully intended drawing your especial attention, namely, the gum-gallic process, as worked by Mr. R. Manners Gordon. Colonel Stuart Wortley—no mean authority in dry-plate work—says of it that it is the best of all dry processes with the bath. I worked it with the strong alkaline development, and found it as near as possible as quick as wet collodion. I have some negatives taken with a six-inches single view lens, quarter-inch stop, in twenty seconds. However, as you wish me to give you my way of using the Liverpool Dry-Plate Company's emulsion, I shall have great pleasure in referring to the gum-gallic process and also several others on some future occasion; that is, if it be the wish of the members, and if my doing so will give any impetus to dry-plate photography, especially among the junior members of the Society.

To make my notes as short as possible I will now give you merely an outline of my way of using the Liverpool emulsion. I do not confine myself to the letter of the law laid down by the Company in their printed directions sent out with every bottle of emulsion; still their way may be best, and it may be my want of skill in manipulating and working out their instructions which makes me succeed better with my own modification. However, I am quite certain that the best negatives in my possession have been made by the method I will now explain; and I may add that they have been very often admired by brother amateurs who have not succeeded so well by following literally the Company's instructions.

I first clean the plate well, then coat with my old dilute albumen as mentioned for the tannin process, and then dry in my drying-box. The Company now recommend india-rubber in benzole as a substratum; but I have experienced no trouble as yet with my old albumen solution. This is soon done. We are now ready for coating the plate with emulsion. "This is grand! Away with baths and dishes and preservatives! Hurrah! hurrah!" cry the amateurs, who are constantly bothered by never finding their chemicals twice alike when desiring to prepare a few plates; while, if a few weeks of bad weather have intervened, your constantly-changing chemicals are all wrong and out of order. Still I think it is better for a beginner to work a bath process, and get good results, before going in for emulsion; he will get some good schooling, which he will stand in need of many a time. I was often annoyed with emulsion work when making my own emulsion; but, having of late years very little time to spare from business, I hailed with pleasure the announcement that the Company would prepare an emulsion to keep indefinitely and require no preservative. On trial I found it

first-rate, and that prepared last season better, I think, than the former. It also gave such an opaque film as to require no backing. If your emulsion bottle has been standing unused for a long time, let it have a good shaking—not just an hour or half-an-hour before using, as directed, but several times. I found some of mine to give transparent spots; it was a sample I had by me for a year. It had been well shaken up as directed, and I was going to pitch it out as a bad lot; but on shaking it up several times next day, and trying another plate, it gave a film without a speck. On examining the spots on the spoiled plate with a microscope, I found that in the centre of each spot was a small particle of what I took to be undissolved gum of some kind—perhaps gum ammoniacum. I am told this gum is used in making the emulsion. However, next day they did not exist; so, for the sake of saving a little trouble, do not omit to shake the bottle well.

Now begin by uncovering the neck, &c., of the emulsion bottle; and have also ready a clean bottle, in order that in coating the plate you can return the surplus emulsion off the plate into it, so that if you do gather particles of dust, &c., or anything else, you do not run it back into the bottle you are using. My drying-box, as I said before, holds six 12 × 10 plates. I coat the six plates, put them in the rack before mentioned, and then pass the whole into the box, light up my gas stove, and in about forty minutes they are perfectly dry. I then pack them away in my double dark slides. The trouble of preparing these plates, as compared with the bath ones, is very small. I find these plates about the same as the tannin for rapidity.

I begin the development by wetting the plate with ordinary alcohol. Methylated spirit will do. Now wash thoroughly under the tap until all greasiness disappears; then, according to the Company's directions, I pour on a solution of pyrogallic acid, three to five grains to the ounce, and let it stay on for a minute or more. You can now form a pretty good idea of the exposure. If the image appear in all the well-lighted parts add to the pyro. two minims of a solution of bromide of potassium ten grains to the ounce, and flow it over the plate two or three times; then add, one or two drops at a time, ammonia ·880 of the strength of one drachm to one ounce of water. When the details are all out add equal quantities of bromide and ammonia solution, and continue the development until the density is sufficient. In many instances I have found a difficulty in getting density by the alkaline method, so that now, in every instance, as soon as I get all the details out, lacking nothing but density, I wash the lot off the plate, and begin with the ordinary pyro. and silver, when the density comes up quickly without fear of fog and free from stains of any kind. I do not say that my mode is best, only with me it succeeds best. All the 12 × 10 plates before you are done in that way.

I have very little more to add, excepting that if you lack density after fixing with hypo. give a slight dose of tincture of iodine in water, about the colour of sherry; then wash well, re-intensify in the usual manner, and your negatives will be as clean as possible and free from stains of any kind, bearing comparison, as to quality, with bath plates by any process. I have trespassed upon your time much longer than I originally intended, and I am afraid with a good deal of old matter with which you are all acquainted; but the fact is, we must keep dragging it up and keeping it constantly before the eyes of the junior students of dry-plate photography.

W. T. Burrow.

Meetings of Societies.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.

The usual monthly meeting of this Society was held on Tuesday last, the 9th inst.,—Mr. J. Glaisher, F.R.S., President, occupying the chair.

Captain Philp was elected a member.

The Chairman, in a few complimentary remarks, intimated the presence of Professor Romellaere, of Brussels, to whom he accorded a hearty welcome, which was acknowledged (in French) by the talented visitor.

Colonel Stuart Wortley exhibited and explained the nature of Canon Beechey's split sunshade.

Captain Abney then read a paper *On a Method of Measuring the Diurnal Photographic Intensity of Daylight.* This will, we expect, appear in our next number.

Colonel Wortley referred to the evidently imperfect method of preparing sensitive paper that had been adopted by Professor Roscoe, to which allusion had been made in the paper.

Captain Abney, however, said he was not in a position at that moment to furnish all the details connected with its preparation; and, in reply to a question by Mr. Spiller, he (Captain Abney) stated that he had not tried carbon tissue instead of sensitised silver paper in obtaining his charts of luminous action.

After a few observations by the Secretary,

The Chairman said that experiments of the kind recorded in the paper could not fail to benefit photographers.

The thanks of the Society were tendered to Captain Abney.

It was intimated that a paper by Colonel Wortley would be read at the next meeting, and that the exhibition under the auspices of the Society would open on Friday, the 8th of September. Pictures must be sent in on one of the first four days of that month.

The proceedings were then terminated.

EDINBURGH PHOTOGRAPHIC SOCIETY.

An ordinary meeting of this Society was held in the Hall, 5, St. Andrew-square, on the evening of Wednesday, the 3rd inst.,—Dr. Thomson, the President, in the chair.

The minutes of the previous ordinary meeting were read and approved, and Messrs. James Anderson, John Millar, and W. B. Hay were admitted as ordinary members.

The principal business for the evening consisted of a demonstration of pigment printing by Mr. Tunny.

Mr. J. G. Tunny, in introducing the subject, referred briefly to the fact that the two grand discoveries in connection with carbon printing, as carried on at present, were made by Edinburgh men—the first, the action of light on alkaline bichromates, by Mr. Mungo Ponton, in 1838; the other, the exposure and development on opposite sides of the tissue, by Mr. C. J. Burnett, in 1856. He (Mr. Tunny) then followed up this introductory matter with some interesting historical details of the progress of carbon printing, tracing the gradual development of the process up to its present very satisfactory condition. The method of preparing the tissue was then fully explained, although he did not think it was likely that photographers generally would trouble themselves with that branch, as really excellent tissue could be readily obtained as a commercial article. The method of sensitising the tissue in the bichromate solution was next shown, and special attention was directed to the fact that a sheet much larger than the dish which contained the solution could easily be sensitised, if it were immersed in the form of a roll, and rolled and unrolled while in the liquid. The moist sensitised tissue was dried by being placed, face up, on a sheet of paper laid across a thick, round stick, it being then ready for the printing-frame. Considerable difficulty was said to be experienced in hitting the right time of exposure, but he assured the members that that was easily overcome by a little experience, especially when aided by an actinometer, one form of which instrument was shown and explained. Several pieces of tissue that had been exposed were then successfully developed on plates of opal glass, the after-removal of the print being secured by a rubbing with French chalk, which he thought much better than the usual mixture of either wax and resin, &c. Then some plates with prints ready for removal were operated on and the prints handed round for examination, the result being an unanimous expression of opinion that they were quite equal to anything that had been seen in pigment printing. Attention was next directed to the production of transparencies for enlarging purposes, and he (Mr. Tunny) said that the result of numerous experiments led him to recommend the use of a tissue made with gelatine, saccharine matter, and mercuric sulphide, vermilion. Tissue prepared in that way gave a beautiful non-actinic transparency, thoroughly suited to the purpose. Several examples were handed round the table and much admired. In conclusion, he said that complaints were sometimes made of the want of lustre or brilliancy in prints by the single transfer process, and showed that that could be obviated by using ordinary albumenised paper instead of the transfer-paper usually employed. The method he recommended was to draw the paper through strong methylated alcohol to coagulate the albumen, and when it was dry to lay down the exposed tissue in the ordinary way and develope on it. The result would be a surface exactly like a silver print on albumenised paper.

The President said he was glad to see Mr. Tunny's name in the billet, as he then felt certain there would be something interesting to be both seen and heard. That he was not alone in this opinion was evidenced by the very large attendance of members, and he was sure that all had been very much gratified. Mr. Tunny's skill and dexterity in manipulation were well known, and he was certain both had never been shown to more advantage than in the demonstration which they had just seen—a demonstration which, he was quite sure, was as complete in all the little dodges and wrinkles that go so far to ensure success as experience could suggest, so that none who had seen it need to take a long journey and pay £3 3s. or any other sum. He should like to ask Mr. Tunny if negatives of various degrees of density were better printed under tissue of various qualities, as was the case in silver printing.

Mr. Tunny replied that he was not yet in a position to reply definitely, but thought it likely that longer experience might show such to be the case. Varying degrees of sensitiveness were readily obtainable in the

tissue—the stronger the solution of bichromate, up to the point of crystallisation, the more sensitive was the film. In reply to another question he (Mr. Tunny) said that he had noticed, and taken advantage of, the continuing action of light, having been able repeatedly to give a shorter exposure than usual, and then after the lapse of some hours to develope satisfactory pictures.

Mr. E. W. Dallas wished to warn the members against trusting to make good work by the aid of the continuing action of light. Some time ago, when producing prints at the rate of three or four hundred a day, he had tried to utilise it, but failed most miserably—the gelatine becoming quite insoluble, and the production of good prints an impossibility.

Mr. Norman Macbeth thought the prints just shown by Mr. Tunny were very fine. He had no doubt as to the permanency of the carbon, but very much as to the colouring matter by which the warm tone was imparted. If some of the lake colours were used they would most certainly disappear. He would suggest the use of rose madder as a colour likely to be permanent.

Mr. James Ross said that he was very much delighted with Mr. Tunny's demonstration. Mr. Tunny and he were sometimes twitted with being the *old* men of the profession; but it was quite evident that at least Mr. Tunny had lost none of the vigour and dexterity which had always been his characteristics. The members were much indebted to that gentleman for giving so freely the results of what must have been the fruit of long experience, and in such a way that any who had seen it could not fail to succeed on a first trial.

Mr. J. M. Turnbull said the thing which gave pigment printing its importance was the alleged permanency of results. Now, while the carbon was, no doubt, quite permanent, it gave a print of a disagreeable yellowish green, and required toning to please the eye, but the substance used for that purpose was not always to be relied on. He had got from Mr. Tunny a carbon print in January, and it had been hung in his studio ever since, one portion being covered by brown paper. The exposed parts had faded considerably, showing that it was not more permanent than a silver print. [The print was handed round, but the members generally could see no trace of fading in the exposed parts.] He (Mr. Turnbull) went on to say that silver prints might with proper care be made as permanent as carbon, and that the cost of pigment prints, in consequence of the nature of the process by which they were produced, would be such as to prevent their general introduction—for small work at least.

Dr. Dickson suggested the use of some of the oxides of iron to give tone to the carbon, as they would be found quite permanent.

In answer to a question as to the best way of managing an over-exposed carbon print,

Mr. Tunny replied that an increase in the temperature of the water answered best.

Mr. Bashford said that the action of a weak alkaline solution, such as carbonate of soda, would reduce the print satisfactorily.

Mr. Dallas then exhibited on the screen an enlarged transparency of the negative of the spectrum, with the peculiar markings, which was shown at the previous meeting; but, although several explanations of the phenomena were suggested, there was not one which seemed to meet with general acceptance.

Votes of thanks were given to Mr. Tunny and Mr. Dallas, and the meeting was adjourned.

WEST RIDING OF YORKSHIRE PHOTOGRAPHIC SOCIETY.

The ordinary monthly meeting of this Society was held at the Commercial Hotel, Bradford, on the evening of Monday, the 1st May,—Mr. Wm. Cook, Vice-President, in the chair.

After the minutes of the preceding meeting had been confirmed, the Society proceeded to elect the following gentlemen as members:—Mr. H. J. Herbert and Mr. Braybrook, Bradford; and Mr. R. Newsome, Shipley.

Mr. W. T. Burrow read a paper on *A Few Notes on Dry-Plate Photography: Bath versus Emulsion* [see page 223], after which was passed round a large number of tannin and Liverpool emulsion 12 × 10 plates, which were greatly admired by the members present. The emulsion negatives were pronounced the best—especially where it was a question of short exposure—although the tannin plates proved that in the hands of such a proficient dry-plate worker as Mr. Burrow high-class photographs could be produced by them, showing that he was equally at home with the tannin and the emulsion processes. Mr. Burrow also exhibited diagrams of his drying-box, and informed the members that the idea was originated by seeing it described in The British Journal of Photography some years ago by the Rev. Canon Beechey.

Mr. Howarth thought that Mr. J. W. Gough, their late President, was really the inventor.

Mr. Howarth moved, and Mr. Thompson seconded, a hearty vote of thanks to Mr. Burrow for his very excellent paper, which was unanimously carried.

The Chairman passed round a number of plates, which were the results of some experiments he had made with Mr. M. Carey Lea's collocine developer. He stated that he had not found any benefit from its use, but intended to test it still further.

The meeting then became of a social and conversational character until its adjournment.

BERLIN PHOTOGRAPHIC SOCIETY.

At a meeting of this Society, held on the 24th March, Dr. Vogel presiding, eight *carte* pictures were shown by Herr A. Moll, which were printed upon a single sheet of paper in the "multiplicator" printing-frame described in our last week's *Foreign Notes*. Two landscape negatives taken by Herr Schlicht on emulsion plates prepared by himself were next shown, and were pronounced little, if at all, inferior to those prepared by Solomon. In a communication which accompanied the plates Herr Schlicht stated that, owing to the inconvenience which attended his having to procure his emulsion plates from London, he was led to experiment on his own account, and had succeeded in preparing the plates laid before the meeting from the directions given by Mr. Newton. The exposure given was the same as that required by some English emulsion plates which he had used about the same time, namely, one minute and three-quarters. Tincture of nux vomica was used as a preservative, the developer was Colonel Stuart Wortley's, and the substratum was india-rubber dissolved in benzole. The camera used was made for Herr Schlicht by a local cabinet-maker; it folded up, together with double dark slides, into a space of 5.3 × 17 × 18.2 centimetres, so that it could be carried like a sketch-book. The accompanying stand folded up into a walking-stick.

The President read a communication from Herr Schmid, of Aarau, upon the value of silver residues, which gave rise to some discussion.

Dr. Weissenborn said that the communication confirmed him in his opinion that it was more advantageous to photographers to reduce their residues themselves than to sell them; but he thought the process recommended by The British Journal of Photography for the reduction of chloride of silver too complicated. The chloride of silver was first dissolved in ammonia, then, by the addition of zinc, chloride of zinc was formed, and the silver precipitated in the metallic state; this precipitate was then purified by sulphuric acid from the zinc with which it was mechanically mixed.

Herr O. Lindner thought that the process was far from complicated, as the metallic silver could be converted at once into nitrate of silver.

Professor Vogel said that silver so obtained would be much too impure for such a purpose, as the zinc was often mixed with iron, lead, &c., which metals, finding their way into the silver, would render the latter unusable for photographic purposes. As the smelting could not be avoided he considered the process much too complicated, since the chloride of silver could be reduced at once by smelting with soda.

Herr Prümm took exception to Herr Schmid's calculations in so far that he generally received about nine marks (nine shillings) per kilogramme (2·2046 lbs. avoirdupois) for paper which the latter had reckoned as worth six marks per kilogramme, and that he still thought it paid better, on the whole, to sell his residues when all the time, &c., employed in their reduction was taken into account.

Herr O. Lindner said that he had never got more than five marks per kilogramme for his silver paper.

The President then begged those who reduced their own residues to calculate exactly once more what percentage of the silver used by them was recovered. According to a former calculation the washing water used before toning contained about fifty per cent. of the silver employed, and that might easily have been the case in the days when about three grammes of nitrate of silver per sheet was used, but now that one was more economical with one's silver (1¼ gr. per sheet) the percentage waste might be considerably smaller. He also said that it would be interesting to know how much was generally recovered from the hyposulphite of soda. He believed that it was almost all lost in the latter.

Professor Vogel then exhibited a number of spectral pictures taken by Captain Waterhouse, of Calcutta, upon bromised silver plates and ordinary wet plates coloured with eosin. They showed greater sensitiveness at the yellow-green part of the spectrum than at the blue portion. He then showed some collodion coloured with eosin, and demonstrated by means of a spectroscope that that dye absorbed exactly the same rays as those to which it made the collodion sensitive.

The meeting was then adjourned

Correspondence.

The May Meeting of the Photographic Society of France:—M. Le Comte d'Heliand on Tartaric Acid in the Iron Developing Solution; Heliochromy; The Automatic Album; M. Davanne on Sugar of Lime for Alkaline Development.—The Photographic Exhibition of Paris.

The monthly meeting of the Photographic Society of France took place on Friday evening last, the 5th inst.

M. Davanne spoke of the loss the Society had experienced by the death of M. Balard, their late and respected President, and that he (M. Davanne), as well as the board of administration, proposed that M. Peligot should be named President.

The votes being counted, M. Peligot was unanimously elected President of the Society.

M. Le Comte d'Heliand made a report to the Society upon the value of the addition of tartaric acid to the iron developing solution, in order to obtain dense blacks and pure whites for the reproduction of engravings, &c.

This idea is by no means new, but has fallen a little into disuse, for I remember to have employed it with success some ten years since for the intensification of over-exposed negatives. It is very good here and there to bring to mind some of the old "dodges" employed by the pioneers of photography; they serve very often as points of comparison to judge of the value of new ideas.

M. Ducos du Hauron presented a collection of proofs obtained by his heliochrome process. Undoubtedly this gentleman has advanced his discovery during the last year; still, with the exception of one view—that of a forest glade—no one unacquainted with the difficulty of production would set any value upon the rest of his productions. This invention—at least in its present state—cannot become a commercial success; but to a *savant* it is very interesting, for it may truly be said that light is the agent in its production. For instance: M. Ducos du Hauron desires to reproduce a picture containing the three colours—red, blue, and yellow. In order to reproduce the red colour of the picture in its different degrees of shade he places a green glass between the object to be produced and his camera; to produce the blue of the picture he employs an orange-tinted glass; for the yellow colour he makes use of a violet-tinted glass, and, the three monochromes having been produced by this system, he superimposes them one above the other and produces a polychrome. As a scientific result this is very pretty, but, as I said before, as a commercial operation it is impossible to produce *la nature vivante*. As for the reproduction of pictures, my readers can judge the time of exposure required to produce the red colours through green glass in the lens.

Two gentlemen are now in the field as the inventors of photochromy. For myself I think a great distinction may be made between them. In this manner let us call the process of M. Leon Vidal a mechanical process, and that of M. Ducos du Hauron a chemical process, and leave to time the proof of the merits of both.

MM. Baudin and Bouché presented the Society with a very beautiful little instrument which they have named the "*automatic album.*" The inventor has advantageously replaced the well-known American stereoscopic apparatus, which takes up so much room, by a small box which can be used as an ornament for the parlour table, and it can be removed from one place to another with great ease. Fifty to one hundred *cartes de visite* are placed in the interior of the box on a slide; when a wooden knob is turned the portrait rises out of the box opposite to a glass employed to magnify it. When the knob is again turned the card falls down into the box and another rises up, and so on, until the whole collection has passed before the eye of the visitor. The ingenious manner in which the proofs are made to rise, as well as their disappearance, imparts considerable attraction and adds to the charm of the photograph.

M. Davanne made a demonstration before the Society upon the employment of sugar-of-lime solution, of which I spoke in my last. Three plates had been exposed and were developed before the members. The first was washed in a tray, and then a weak solution of pyrogallic acid was poured over it. Carbonate of ammonia was then added, and the proof began to make its appearance. A dozen drops of the sugar-of-lime solution were now mixed with the carbonate of ammonia, and the proof flashed out immediately. The second proof was then developed. Equal quantities of the pyro. and sugar-of-lime solutions were taken. The plate being plunged into this bath the image was rapidly developed. What pleased me very much was that, although the solution was highly coloured, still the whites of the negative remained perfectly pure. I can recommend the readers of THE BRITISH JOURNAL OF PHOTOGRAPHY to give it a trial, for it appears to be a very good accelerator. It is very easy to prepare. Take a piece of lime about the size of an unshelled walnut; pour over it sufficient water to slacken it; put it into a bottle, pour upon it ten ounces of water, and add one ounce of loaf sugar. Shake it well and allow it to settle. If there be a deposit sufficient lime has been employed. This solution remains good for any length of time.

I made a visit yesterday to the Photographic Exhibition, which is under the patronage of the Photographic Society of France, and I can say with pleasure that it does honour to the *council d'administration*, and in particular to M. Davanne, who has been untiring in his exertions to surpass in beauty and in interest all the other exhibitions of that kind which have taken place in Paris; and this laudable endeavour has been thoroughly successful. A *salon* is set apart for photography as applied to science. The instruments which were employed to photograph the late transit of Venus, together with the proofs obtained, are exposed for the instruction of the public. All the *savants* of France have vied with each other in describing their manner of employing photography for their scientific investigations. I remarked two very small and ingeniously-constructed instruments invented by Dr. Ozanan—the one employed to indicate photographically the beating of the pulse, the other to establish the force of a cough. All the government institutions have sent specimens of the use they make of photography. I was very sorry to see that the appeal which the Photographic Society of France made to English photographers has been responded to so slightly.

The Royal Engineers sent some very fine proofs for exhibition. Certainly a blank is visible which, had it been filled up, would have caused emulation among the photographers of both countries.

The platinum printing process would have held its place and excited great curiosity, I am certain, had Mr. Willis (the inventor) been less occupied and had devoted a little time to its organisation. Other countries have not been deaf to the invitation.

M. Offenberg, of Amsterdam, has exhibited the finest collection of carbon proofs to be seen. A French painter could take a lesson in the artistic arrangement of the sitters, &c.

A beautiful collection of proofs are exhibited by a Russian artist.

M. Carlos Relvas, of Portugal, has forwarded a very fine and harmonious collection of proofs. This distinguished amateur has won for himself renown among photographers, as well for his unceasing exertions for the progress of an art to which he has dedicated so much of his time and money as for his well-known patriotism; for it may be said that, before he attempted photographic manipulation, that art was at a very low standard in his native country.

French photographers have not been behindhand. Thinking that they would have a fierce fight for fame they made great preparation for the struggle.

M. Lampué has three or four proofs, three feet in height, made direct from the model.

The well-known firm of Goupil and Co. has a frame fitted with beautiful photo-engravings and photoglyptic proofs.

M. Léon Vidal has a fine collection of photochromic as well as fatty-ink proofs.

M. Ducos du Hauron exhibits a few specimens of his photochromic process. The bust of a lady is produced in a red tint, again in a blue, and then in a yellow one. The three tints are then placed one above the other and the polychromic proof is finished.

M. De Bray, of Nice, exhibits a very excellent frame of views.

M. Thiel has sent a very choice collection of fatty-ink prints. In fact, fatty-ink prints will bear off the palm this year.

M. Quinose, of Toulouse, has also a very fair collection of fatty-ink proofs.

As for enamelled portraits, the two firms of MM. Gougenhiem and Co. and M. Deroche take all the honours, and it will not be very easy to give an opinion as to their respective merits.

To sum up: The eleventh exhibition of the Photographic Society of France is a great success, and no doubt will be the excuse for a good number of English photographers to run over to this gay and charming city, and by the change of scene and air lay in a stock of good health for winter and so cheat the doctor.

3, *Place Bréda, Paris, May* 9, 1876. E. STEBBING, *Prof.*

COMPARATIVE TESTS OF THE PHOTOGRAPHIC EFFECT OF LIGHT FROM DIFFERENT SOURCES.—Comparative tests of the photographic effect of light from different artificial sources have been made by Riche and Bardy. Plates were sensitised with bromide of silver and exposed for sixty seconds at a distance of nineteen inches from light, while screened from its action by ten unequal layers of waxed paper, the first four inches long, covering the whole plate, and each successive layer being one-tenth shorter, the last being four-tenths of an inch long. The effects were compared by noticing, after development, the number of layers of paper through which the light had acted. Thus it was found that the oxyhydric light penetrated but one layer; the Drummond

light, three; that of zinc burned in oxygen, four; of the magnesium light, five; of a jet of nitric oxide passed through a flask containing bisulphide of carbon, six; of a jet of nitric oxide in a vessel of burning bisulphide of carbon, six and seven; of a jet of oxygen in a vessel of bisulphide of carbon, seven; of a jet of oxygen in a vessel of burning sulphur, eight. The introduction of oxygen into a jet of burning sulphur, as it produced the greatest effect upon the bromide of silver, seems to merit further tests as to its practical value.—*N. Y. Commercial Advertiser.*

EXCHANGE COLUMN.

No charge is made for inserting these announcements; but in no case do we insert any article merely *offered for sale*, that being done at the small cost of one shilling in our advertising pages. This portion of our columns is devoted to exchanges only. It is imperative that the name of the person proposing the exchange be given (although not necessarily for publication, if a *nom de plume* be thought desirable), otherwise the notice will not appear.

I will exchange a six-chambered, breech-loading revolver for a pair of good stereo. lenses.—Address, Jas. Thomson, Tynet, Fochabers, N.B.

A new burnisher, five and a-half inches wide, will be exchanged for anything good in jewellery.—Address, Blakey, 114, Bold-street, Liverpool.

A dark tent on three wheels, as per advertisement, will be exchanged for a Dallmeyer's No. 1B long or a No. 2 Ross's *carte* lens.—Address, W. Dakin, 39, Victoria-road, Broomhall-park, Sheffield.

A stereoscopic slide for attaching to ordinary quarter-plate camera; four bound vols. (1 to 4) of the *Journal of the Photographic Society;* also two vols. (1 and 2) bound, of Sutton's *Photographic Notes*, will be exchanged for a whole-plate bellows folding camera.—Address, E. Lockyer, Photographer, Ringwood.

A three-inch diameter Horne and Thornthwaite's portrait lens, whole-plate camera, quarter-plate camera and lens, and quarter-plate Lancaster lens, will be given in exchange for a 12 × 10 or 10 × 8 bellows square camera with two or more double dark slides and case; or offers.—Address, J. H., 20, Berkley-street, Birmingham.

ANSWERS TO CORRESPONDENTS.

☞ *Correspondents should never write on both sides of the paper.*

Notice.—Each correspondent is required to enclose his name and address, although not necessarily for publication. Communications may, when thought desirable, appear under a *nom de plume* as hitherto, or, by preference, under three letters of the alphabet. Such signatures as "Constant Reader," "Subscriber," &c., should be avoided. Correspondents not conforming to this rule will therefore understand the reason for the omission of their communications.

J. How.—The address required is "Twickenham, S. W."

J. Valentine (Dundee.—Thanks for catalogues and enclosure.

G. B. A.—Red blotting-paper is better than that of a yellow colour. It must be well wetted before being applied to the back of the plate.

Nemo.—Blisters in the collodio-albumen process are caused by the toughness of the collodion. With an old and rather rotten sample the occurrence of blisters is quite unknown.

L. H. T.—The aplanatic lenses in your possession will cover a field quite sharply to the edge; hence no expedient for flattening the field will be required. It is intended only for a rapidly-acting portrait lens.

R. (Strand).—Bichromate of ammonia contains a larger proportion of chromic acid than any other of the alkaline or neutral chromates, including the neutral chromate of ammonia. Bichromate of potash will, however, answer most effectively every purpose for which chromium is employed in connection with either engraving or photolithography.

Panoramic—The panoramic camera made use of by M. Silvy was that of the late Mr. Thomas Sutton, the lens of which is a thick glass globe filled with water. It is impossible to answer your second query, viz., "What is the best possible lens for a panoramic camera," until we know the construction of the camera. Any of the manufacturers of cameras and apparatus will doubtless supply a bellows body.

B. J. B.—Although quite right in every other respect you are wrong in your estimate of the flattening power exercised by the meniscus form of the lens. To have acted in the manner you imagined the hollow curve would require to be much deeper than it is. Within certain limits, the deeper the curves of both the surfaces of the meniscus the flatter will be the field and the wider the angle of view included. Hence all wide-angle lenses *must* be composed of deep menisci.

Old Photo.—We have not had much experience with the Harrison "globe" lens; but, while we can bear testimony to the fact that it will include a wide angle, and give good definition when used with a small stop, we are aware that wide-angle lenses of more modern introduction, and constructed by English opticians, possess these properties in greater perfection. A well-recognised fault of the "globe" lens consisted in its projecting a luminous or "ghost" spot on the centre of the plate; and in addition to this it did not include by ten or more degrees such an angle of view as could be obtained by English wide-angle lenses.

Ed. Ingram.—The best antidote in a case of poisoning by nitrate of silver is the swallowing of a solution of common salt in water. The *rationale* of this method of proceeding is obvious: the nitrate of silver is decomposed by the common salt and chloride of silver is formed. The former is very poisonous, the latter is not so.

Jas. Thomson.—The description of the shutter is still to be utilised. From what we can see, the lenses in the stereoscope are rather too close together; it will be necessary to remove them farther from each other so as to present to the eye the portions that are nearer to the inner margin. The faculty of observing binocular pictures in stereoscopic relief without a stereoscope is by no means rare; you will find an article devoted to this subject in our Almanac for the present year.

H. W. D.—1. We have not yet had time to analyse the powder so as to ascertain definitely of what it is composed. 2. In giving directions for developing the dry plates we assumed the quantity of the developer to be sufficient for an 8 × 5 plate. 3. We have seen Mr. Warnerke develope a negative on his tissue very successfully by the means described in his printed directions. We are not yet, however, in a position to speak of the subject from personal experience, although we expect this will soon be the case.

Beginner.—1. We are unable to indicate by what means Mr. Banks "mercurises" his moulds so as to render them conducting. 2. We have no doubt that one of several other kinds of oil, such as that of lavender, would answer the purpose equally well. The bitumen to which reference was made was purchased in Long Acre in 1865, and it proved an excellent sample. We have not tried that which has been sold there during the last few years. Thanks for the French sample enclosed, which we shall try before long.

S. B. Hayden inquires if the "Peripatetic Photographer" be really correct in saying that a patent will not be valid if it can be shown that the applicant is not the first inventor of that for which he seeks to obtain protection, as he is aware of an invention patented by a certain gentleman who is not the inventor of it at all, but who purchased it from the real inventor—a working man—for thirty pounds, and yet government has granted to the purchaser the patent right he sought.——In reply we state that, if the matter be as represented by our correspondent, the patent is undoubtedly invalid. The proper way by which to have secured the invention in a legitimate manner was to have taken out the patent in the name of the real inventor, who could then assign it to the financier.

R. A. Scott.—The want of intensity in the gelatine negatives is easily accounted for. In the first place, an exposure of ten seconds late in the afternoon with dry plates is rather insufficient, even when the plates are very sensitive. To obtain a properly-exposed portrait in that period of time no diaphragm ought to have been inserted in the lens. Gelatine plates are certainly very sensitive, but there is a limit to that quality. It is not yet much known that negatives cannot be intensified with so much facility after being fixed and even dried as those prepared by means of gelatine. If they have been dried place them in a vessel of cold water for two or three minutes, and then pour over the surface *quant. suff.* of an acid solution of pyrogallic acid, to which has been added a little solution of nitrate of silver. The proportions may be three grains of pyrogallic acid and three grains of citric acid to the ounce of water. These will keep well in solution for several weeks. To as much of this as will cover a plate of about cabinet dimensions add two drops, or more if necessary, of a thirty-grain solution of nitrate of silver, and apply to the surface of the negative, which must have been previously made wet. The details will now be seen to acquire great intensity, and many details not previously visible will make their appearance. The action of the intensifier may be stopped at any moment by means of water. Care must be exercised so as not to allow the intensification to proceed too far; for the colour of the image is a very non-actinic brown, which stops the transmission of the chemical rays of light in a much more effective manner than would at first have been imagined.

Received.—B. B. (Limerick); H. B. B.; John Lamb; S. E. Pettitt. In our next.

☞ **Editorial Communications should be addressed to "THE EDITORS"—Advertisements and Business Letters to "THE PUBLISHER"—at the Offices, 2, York-Street, Covent Garden, London, W.C.**

METEOROLOGICAL REPORT,

For the Week ending May 10, 1876.

Observations taken at 406, Strand, by J. H. Steward, Optician.

These Observations are Taken at 8.30 a.m.

May.	Bar.	Wind.	Wet Bulb.	Dry Bulb.	Max. Tem.	Min. Tem.	Remarks
4	30·32	SE	43	47	59	39	Cloudy
5	30·41	SE	44	49	62	39	Cloudy
6	30·28	E	45	52	67	41	Dull
8	30·43	E	45	50	59	41	Cloudy
9	30·36	E	43	50	58	43	Cloudy
10	30·26	E	44	49	—	41	Cloudy

CONTENTS.

THE BRITISH JOURNAL OF PHOTOGRAPHY.

No. 837. Vol. XXIII.—MAY 19, 1876.

ON THE USE OF THE SWING BACK IN PORTRAITURE.

There are few outdoor photographers who are not alive to the many uses of the swing back for landscape purposes—for correcting false perspective, bringing foregrounds into focus, propping up shaky perpendiculars, and altogether harmonising opposing optical conditions. To those who are still ignorant we would say seize the first opportunity that presents itself of borrowing a friend's instrument possessing this adjunct, and carefully observe what difference can be made with its aid. If the friend know the uses of his instrument, and will volunteer a practical lesson, so much the better. But there are many very successful portrait photographers who never took a landscape picture in their lives, and from long observation we have come to the conclusion that a very large proportion, if not the majority, of them possess no further acquaintance with a swing back than its name, nor do we remember its general adoption having ever been recommended for portraiture. Indeed, we have the best of grounds for stating that one of the first photographers in the kingdom, a frequent medallist, and one whose works are in great and deserved repute, had not—at any rate up to a recent date—such a thing as a swing-back camera in his establishment. Perhaps some of our readers would reply to this that if such an one can do such good work as to obtain all these honours a swing back cannot be much use or he would have one; but they would be entirely wrong, as we hope a slight consideration of the remarks we shall make will show.

We may repeat in this connection the well-worn explanation of the principle of the use of the swing back. All that it does is to enables us to focus a number of objects lying in a plane oblique to the ground glass—that is, at other than a right angle to the axis of the lens. It does not really give any nearer approach to "depth of focus" than a rigid camera does, yet at times it *appears* to impart this quality to a considerable extent. For portraits its full usefulness can be called into play to a far greater extent in this direction than in landscapes including buildings. Thus, in adjusting a swing back to take in a lofty building, to avoid converging lines it has to be moved in a direction exactly contrary to that required to bring the whole building into focus with a wide aperture. But, in fact, although we have just said that most outdoor photographers are alive to its use, we should qualify our statement by saying that, as a rule a camera maker supplies a *landscape* camera with a swing working only in a vertical plane; and, further, there is at least one large and well-known manufacturer who usually makes his swing to work in a still more restricted direction, namely, outwards and not inwards—that is to say, the top of the plate can be made to incline only to the operator, not to the *inside* of the camera at all. We became aware of this through being applied to as a referee by a gentleman who well knows what a swing back can do, and who considered he had been supplied with an imperfect instrument through its working (in one plane only) in the limited direction indicated.

To return to our illustration. In taking a lofty structure which requires the camera to be tilted we have to swing the back till it is parallel to the face of the structure, if we wish to have parallel vertical lines; but this quite prevents the top and bottom being in focus at once, and hence the necessity for a small stop. But in studio work he would be a clever man who could discern in the varying curves of the "human form divine" whether they were in perspective or not when the lens was placed at an angle of not more than ten or fifteen degrees, and thus the whole power of the adjustment can be centered upon the effort to equalise the focus. We will give an illustration of our meaning:—A nervous, fidgetty sitter is to be taken; he manages at last to seat himself in a very passable attitude with the exception of one hand, which is dreadfully out of focus through being so much nearer the camera. What is to be done? If the operator alter its position the sitter's nervousness may probably be so increased that it will be impossible to get him right again; if a small stop be inserted to get "depth" the chances are a hundred to one that he moves and so spoils all. But just a little tilt of the back, and lo! the hand is in focus like magic, and the figure generally lying, roughly speaking, in a slightly-oblique plane is altogether improved in distinctness. But as there is no rose without a thorn, so the thorn here is that the tilting of the back has a tendency, while improving the focus, to increase the size of the hand; this, however, is so slight as to be practically imperceptible.

Again: both hands are often so placed that one lies apparently almost behind the other, and with a full aperture they cannot be made to focus; here the side swing—that is, that in a horizontal plane—puts matters right again. Or a lady with beautifully arranged and decorated hair wishes for a "large head" taken quickly, as she "can't stand long." If she be taken three-quarter face, as the majority of people are, and her face—say her eye—be focussed sharply, the beautiful hair disappears in a fuzzy, hazy mass, and the charming effect is lost. Let the back, however, be swung sideways a little, and a head fairly in focus is the result. Again: the photographer has to take the portrait of a lovely child, with flowing, golden tresses tossed in rich profusion about her shoulders—one beautiful, tangled mass, coming far forward, making a perfect picture of loveliness, but torturing the operator by its utter want of definition as depicted on his ground glass. A slight adjustment of the upright swing puts everything right in a moment; and the tiny sitter can be taken in the fraction of a second of time, so that a bright smile also can be caught that would have been quite lost in the exposure of the few seconds that a smaller stop would have necessitated.

We have here given but a few of the cases where the swing back is so useful for single figures; but they are as nothing compared with its usefulness for groups. Who is there that has not felt oppressed with the monotony of position enforced by rigid optical requirements when a couple of sitters have to be arranged together! Yet by means of the swing back a far greater latitude in the disposition of the figures is permissible. We know, from the piteous tales of many an operator, how trying to the temper is the arranging and photographing of groups. "It is a perfect nuisance," says one; "I would rather do anything else on a busy day," says another; "It seems," says a third, "as if everyone felt bound to be funny when standing for a group; and the way they wriggle about and "chaff" would try the patience of Job." What is wanted is a quick exposure and easy focussing. The latter, to a great extent, may be brought about by the use of the diaphragm, but it is quite incompatible with

the former. With a swing back any average lens can be used with the full aperture, and two full-length figures, one about half-a-yard in advance of the other, brought out perfectly sharp; and, as is often the case, if there are more figures introduced, lying on the ground in front of the other, they also can be brought in equally distinct.

We now have before us as we write a photograph—by a contributor whose name is very familiar to our readers—of a couple of lively terriers, one behind and in advance of the other, taken with one of the new baby lenses of a well-known optician, which is, perhaps, about $\frac{f}{2\frac{1}{4}}$. They are very sharp, and without the movable back such a pose could not have been well secured with a lens working very quickly—in other words, having the least "depth of focus" of any kind.

For full-length figures the makers of the best lenses recommend the rising front of the camera to be raised about half-an-inch, to get the feet well in focus; and an excellent method it is. The leading photographer at an important watering-place, well-known for his beautiful studio and *genre* pictures, introducing natural open-air backgrounds and foregrounds, used a camera with an inner frame specially made to hold the plate considerably below its usual position in order to attain the same end. But this plan also, especially when at all straining the power of the lens by taking a large figure, necessitates the use of the stop to prevent astigmation being disagreeably perceptible in "fuzzy" definitions. Here, again, a swing back is of use. A very slight tilt is sufficient to bring into good focus the feet of the standing figure, the only ill effect being the very slight reducing of the height of the subject—a reduction which no one one would notice, and which would entail no pictorial disadvantages.

We have only here given a few instances out of many which occur to us of the usefulness of this adjunct to the usual studio apparatus, and we think they only need a little consideration to prove their value to thinking operators. We trust that when next we have an opportunity of looking round we may find our hints acted upon. We are very certain that wherever this is the case the results will be admirable.

A brief reference to the form of back best suited for the purpose may be desirable. For field work the minimum of lightness and bulk and the maximum of portability are the great desiderata; but, for the studio, convenience and strength are most looked for. Hence we should advise the motion to be given to each swing by rack-work and not by the hand only, as in landscape cameras. We are assured by practical men that the rack is a very great convenience in adjusting the swing to a nicety, and, in fact, doubles its working power.

We conclude with a little advice intended for the camera-maker as well as for his customer. In most cameras for outdoor work made by well-known manufacturers, and in all for indoor work which we have seen, the pivot on which the framework is arranged is centrally arranged as regards the sides and top and bottom, and, consequently, when a motion is given to it one end of the focussing-glass retires as the opposite one advances. We possess a camera in which the centres of motion are the edges of the plate and not their centre, and thus, when using the swing, one end is fixed and the opposite one only is moved to and fro, and we find this to be a great convenience. Thus, in adjusting the back for two objects situated near the edges of the plate, if one be first focussed and then the back be swung to get the other sharp, the first-focussed object will still remain sharp during the alteration with the construction we recommend; but in the other form, while one object is being focussed the other is being "unfocussed," and so a sort of trial and error plan has to be adopted. Very likely this is a more difficult mode of constructing the back, but that is the maker's province, and we recommend all our readers who think of adding a swing back to their studio cameras to have them of this form.

THE SCIENTIFIC EXHIBITION.

As we last week intimated, there is now open in the Exhibition Buildings, South Kensington, London, a large, varied, and most valuable collection of scientific apparatus and appliances. Its intrinsic value is great, its historical value much greater, but in its educational importance is to be found the chief value of this unique collection.

Among the varied branches of applied science represented are light, geometry, dynamics, molecular physics, sound, heat, magnetism, electricity, chemistry, geography, geology, biology, and mineralogy. Under the first of these are to be found lenses of every kind, stereoscopes, lanterns, objectives for telescopes, microscopes, spectroscopes, polarisers, radiometers, photometers, and photographic instruments. It is with the last named we have to do at present.

There are several photographic lenses of both ancient and modern construction. Among these are some bearing the announcement of their being "portrait lens combinations of two achromatic objectives, first constructed, in 1839, by Voigtländer and Son." On the other hand, there is another lens exhibited in the same case which was constructed for Mr. Henry Collen by the late Mr. Andrew Ross, optician. We are aware that this Ross objective has long been considered by some to have been the earliest combination lens constructed; but, as the date of the manufacture of the latter lens is "1841," while that of the Voigtländer combination is "1839," priority must, and will ungrudgingly, be awarded to the foreign scientist. From the position of the Ross lens in the show-case we were unable to read the announcement attached to it. We fix 1841, however, as the date of its manufacture, because it was in that year that Mr. Collen—at that time an artist whose *specialité* was the painting of miniatures—having seen a portrait, produced by Mr. Fox Talbot, in February of that year, was so deeply impressed by the picture that he hastened to acquire a knowledge of the method by which it had been produced and also a license to work the process professionally. It was in order to enable Mr. Collen to accomplish this object the lens in question was manufactured.

Not merely, however, are photographic lenses of a past period here displayed; several of the newest and most approved construction are exhibited by Mr. Dallmeyer, in addition to similar contributions from the firms already named.

There are numerous lantern transparencies of excellent tone and quality contributed by the Woodbury Permanent Photographic Printing Company. Pictures of this class are also exhibited by Messrs. James How and Co. from negatives by Dr. Maddox. M. Romaine Talbot, likewise, has sent a number of similar transparencies of microscopic and other subjects.

There are several daguerreotype pictures, possessing both interest and merit, to be found in the collection. Among these we observe the second picture taken by Daguerre himself. It is impossible to look upon this fine picture—which, for a daguerreotype, is of large dimensions—without realising in some measure the excited feelings of the inventor when such marvellous pictorial details became slowly visible under the action of the heated mercury by which the daguerreotype was developed. There is a second daguerreotype, by the inventor, of about 9 × 7 inches in dimensions. One of the earliest specimens of daguerreotypes fixed by Fizeau's hyposulphite of gold solution, taken by M. Hubert in 1840, adds value to this department of the collection. In the same year was taken a picture (also to be seen here) in which the details were developed, not by mercury, but by that peculiar "continuating" action discovered by M. E. Becquerel as peculiar to the red rays of light. This *savant* found that when a daguerreotype plate prepared with iodine alone was exposed in the camera the development of the latent image therein impressed could be effected by means of subsequent exposure to light under a red glass; hence he published his theory of "exciting" rays and "continuating" rays of light. We may take advantage of our present subject to observe here that the late M. Claudet, in 1847, made a communication to the Royal Society in which he stated that the red, orange, and yellow rays destroyed the action of white light, and this to such an extent that a surface bearing a latent image became again uniformly sensitive, as before, upon exposure to such coloured rays.

To the various specimens of processes of printing exhibited we shall not at present allude, beyond mentioning the fact that among the contributors are the Autotype Company; the Wood-

bury Fine Art Company; Messrs. Edwards and Wright, who exhibit specimens of the "nitrotype" process; Goupil and Co., who exhibit engraved plates and impressions taken from them; the School of Military Engineering (papyrotype specimens); Mr. H. Fox Talbot (photoglyphic engravings); Mr. W. Willis (aniline prints); Mr. W. Willis, jun. (specimens of the platinum printing process); Mr. Warren De la Rue (specimens of Paul Pretsch's phototypography); Mr. Dallas; M. Dujardin; M. Gillot (specimens of phototype or photo-engraving); M. Vidal (chromo-photographs); and several others. In our next notice we shall have something to say regarding these, and also with respect to the enlarged photographs of Professor Piazzi Smyth, the various contributions of M. Poiteven, M. Niepce de St. Victor, the enamels of Mr. Mayland, and many others.

ON VARIETIES OF CARBON.

We presume it may now be taken for granted that carbon printing has passed from the experimental stage, becoming a commercial success; and that the requirements of the public combined with the admitted facility with which really excellent carbon prints can be produced will—gradually it may be, but none the less surely—drive silver printing, to a considerable extent at least, out of the field. Under these circumstances it is but natural that both the producers of carbon prints and those for whom they are produced should desire to have some tolerably accurate knowledge of the method of production and properties of the substance which forms the basis of pictures in carbon, and to which they are indebted for that permanence which is their chief characteristic.

Although it is quite true that many experienced carbon printers can now produce prints quite equal to, and in some cases even surpassing, prints in silver in all the qualities that contribute to the excellence of a photographic print, it is no less true that carbon printing owes its existence not to that, but to the fact that public confidence in the stability of silver prints has long been of the weakest description, while the belief in the permanence of carbon is almost universal.

Those who remember the early days of photographic printing—both previous to and after the introduction of albumenised paper—know that for a considerable time rich black tones, as near an approach to that of an ordinary engraving as possible, were eagerly sought after, and that the purple-blacks and warm browns were at first regarded with but little favour. They gradually, however, made their way, and, as fashion has a wonderful influence even in such a matter as this, they are now in almost universal demand. Setting the influence of fashion aside, it may be a question as to whether the warm browns of the present silver prints or the rich blacks of the best engravings are the more artistic; but there can hardly be a doubt in the mind of any one that the difference is so slight that if the one mean permanence and the other instability the former should be used and the latter discarded.

The desire to imitate as closely as possible the warm tones of a silver print has led to the introduction into the pigment tissue of a variety of colouring matter, and, as our readers are aware, this has recently given rise to much discussion and, we think, not a little unreasonable doubt as to the permanence of pigment printing generally. Now in view of the admitted fact that there is some difficulty in finding a suitable colouring matter that shall not either affect or be affected by the alkaline bichromates in combination with the gelatine, and shall at the same time resist the action of light or other deteriorating influence, we think it worthy of consideration whether it would not be well to abandon the attempt to closely imitate a silver print and try what may be done with the various kinds of carbon already available, or seek to find some new modification of the substance as shall give results equally satisfying a pure and cultivated taste. Or it may be put in this way: if it be difficult to imitate the tones which fashion at the present time prescribes, see what can be done with *matériel* about which there can be no possible suspicion, and then lead fashion to adopt it.

With a view to acquiring as much information as possible about carbon, as at present produced, we recently took advantage of an opportunity of visiting one of the largest manufactories connected with the production of that substance in this country, and subsequently had an interview with a gentleman who, as a copperplate printer and manufacturer of inks suitable for his purposes, has probably a larger experience than most living men, and now propose to give our readers the result of the information thus acquired.

Carbon in its pure state—with the exception of the diamond, which, according to chemists, is the same body in a crystalline form—absorbs every portion of the spectrum, and therefore appears as absolutely black; but it is questionable whether perfectly pure carbon has ever been seen. Certainly, as generally produced, even after having been subjected to the ordinary methods of purification, it always contains sufficient impurities to give particular characteristic properties dependent on the method of preparation and on the *matériel* from which it has been produced.

The carbon of commerce may, in the first place, be divided into two classes—that made from solid bodies, and that from liquids. The former includes woods of various kinds, especially the branches of the vine, the young shoots and old wood of which give, the one a blue-black and the other a brown-black; while of all solid matter properly carbonised flour gives, probably, the finest variety of carbon in depth of body and warmth of colour.

The liquids used in the production of carbon are mainly the hydrocarbon oils and spirit, the latter yielding a much superior article. In producing carbon from oils or spirit the object is gained by their incomplete combustion—that is, by admitting only sufficient oxygen to combine with the hydrogen, so that the carbon is thrown out; and as the process goes on gradually the solid body is deposited in the finest possible state of division. The Dutch were probably the first to produce carbon in this way commercially, and their original method, which has not been altogether abandoned yet, was to ignite spirit in an iron pan, and cover it over with a blanket. This reduced the supply of air to the proper quantity, and the deposited carbon was from time to time scraped off the blanket. The modern method consists of a suitably-arranged brick furnace, with pipes through which a regular supply of the hydrocarbon is allowed to run, the deposited carbon being periodically removed.

In the manufactory already referred to there are forty such furnaces constantly at work burning hydrocarbon oils, of which ten tons are used per week, yielding one ton of ordinary "black," or carbon of an inferior quality, but sufficiently good for common printing-inks. A finer quality is produced by the incomplete combustion of spirit in the same way, and a finer quality still by the calcining or re-burning of this. These are known in the trade as "spirit blacks," and one or other of them, we believe, is the basis of all the printing-inks in use.

On attempting to suspend samples of the various productions in water for microscopical examination considerable difficulty was experienced with that from the oils, much less with that from the ordinary spirit, and none at all with the productions from calcined spirit. The microscope showed them to be about equally fine, and certainly sufficiently so for any ordinary purpose; but, when mixed in various proportions with a white powder to test their colour density, the difference was very marked, the oil production being nearly fifty per cent. less in value than that of the spirit, and that from the calcined spirit much superior to the uncalcined. We also saw a variety, much better than either, obtained from an American house, and which was said to be produced from the combustion of gas given off during the distillation of the natural oils of that country.

But although carbon produced in the way described is eminently suited for printing and lithographic inks, and also for the various photographic processes of printing in fatty inks, it is, we were assured, vastly inferior to the solid-matter variety for engravings and for ordinary carbon printing. In printing in type, lithography, or wood the surface is flat, and shadows are given by breadth of line; but in an engraving and photograph the same effect is produced by depth of cutting or thickness of gelatine, and, consequently, the colouring *matériel* must be sufficiently opaque or have "body"

enough to produce the desired result. Now this is just the quality in which the spirit black is deficient, and that is probably the cause of the greenish effect so often complained of in untoned carbon prints.

The result of our observations, and of the information given to us, then, is a conviction that success in carbon printing would be best secured by the use of some of the varieties of carbon from wood; and as it seems that considerable variety in colour may be got by suitable selections of solid matter for carbonising, there is room for much useful research in this direction, and probably a rich reward for anyone who may succeed in producing by carbon alone a colour that will satisfy the public taste and be at the same time absolutely permanent.

FINENESS OF DIVISION AN IMPORTANT ELEMENT OF PHOTOGRAPHIC SENSITIVENESS.—OTHER CONDITIONS OF EXALTED SENSITIVENESS.

The suggestions which I sent you lately in reference to the connection between fineness of division and sensitiveness seem to afford a clear and easy explanation of some facts which, though plain and well understood in themselves, have not been hitherto accounted for. For example: a gelatine emulsion plate appears to be much more sensitive than a plain collodio-bromide plate washed over with gelatine. The explanation is that, although silver bromide precipitated in the body of collodion is very finely divided (much more so than when precipitated from water), yet when precipitated in a solution of gelatine it is much finer still.

Again: a collodio-bromide emulsion plate is more sensitive than a bromide plate made with a silver bath, because in the first-mentioned case the silver bromide is precipitated in the viscid collodion. But when collodion is extended over glass and plunged into an aqueous solution, the water, as fast as it penetrates, takes up the alcohol and ether and separates the pyroxyline as a solid body. Silver bromide, therefore, formed under these conditions has much more analogy with the same body formed in the texture of paper; it is formed within the particles of a cellular tissue and not in a viscid liquid, and must, therefore, be in less fine powder. But, as the texture of a collodion film is much closer and finer than that of paper, it is reasonable to suppose that the silver bromide formed within its body will be in finer particles than when formed in paper; and thus we get a reasonable explanation why collodion films are more sensitive than sensitised negative paper.

We may extend the same principle and explanation beyond the cases of the silver haloids, and *even to soluble substances*. It has been long known that the acid chromates—the potassium salt, for example—exhibit a much higher degree of sensitiveness in the presence of gelatine. The reason has never been suspected, but doubtless lies in the same principle of minute division. Pure paper, unsized, impregnated with a solution crystallises in drying. If the solution be strong these crystals appear on the surface; if weaker they are much smaller, and are formed between the fibres. If we first put a gelatine sizing into the paper the tendency to crystallise is diminished; if we dissolve gelatine in the solution of chromate the tendency to crystallise is still more diminished; and the more gelatine we use the stronger may be the saline solution without crystallising. This fact, obvious enough in itself, I have a hundred times verified in the case of the bichromate, in experiments made in past years. The more completely the tendency to crystallisation is overcome the finer will be the particles, and the greater the sensitiveness exhibited.

This theory has the further advantage of explaining and getting rid of an anomaly. The characteristic function of gelatine is that of a *retardant*. For example: in one of the forms of the collodeveloper, which I have elsewhere described, zinc is added to the mixture of sulphuric acid and gelatine. Instead of the rapid and tumultuous action which takes place when mossy zinc is added to a hot mixture of sulphuric acid and water, we have an action that is slow and gradual. The presence of the gelatine increases the time required for solution at least tenfold, and this is the characteristic action, as shown also in the influence of gelatine on the iron development. Gelatine is, therefore, a marked retardant. At first sight it appears most anomalous that it should exhibit with the bichromates an exactly opposite tendency and accelerate the action. The explanation lies in the fineness of division which its presence brings about, and the more rapid exertion of affinities upon finely-divided substances is an everyday experience of the chemist.

Gelatine is a retardant by virtue of the viscid character it gives to a solution. In a viscid liquid the particles of two substances that tend to interact seem to find each other with difficulty, and their interaction is greatly delayed. There is no difficulty in understanding this. The molecules of a viscid liquid move amongst themselves with difficulty, and they interpose the same obstruction to chemical attraction that they do to the attraction of gravitation. The atoms of substances contained in viscid liquids are impeded in their obedience to their mutual attraction, precisely as they are impeded in reaching the bottom of the vessel, as they tend to do in obedience to the attraction of gravitation. In a very viscid liquid particles remain suspended indefinitely.

Precisely in the same way, when a precipitate is formed in a viscid liquid that precipitation is much finer than when formed in one that is mobile. The coarseness of any precipitate results from the molecules finding each other readily as they separate from solution, and attaching themselves to each other in a more or less perfect, though minute, crystallisation. But a viscid liquid opposes an obstacle to the attraction that produces this union of particles, and the result is that there is less tendency to crystallise, and much finer powder is produced. The precipitate once formed, the finer it is the more easily does it undergo decomposition by the application of an external force.

This greater activity and readier chemical action resulting from fine division is a phenomenon that presents itself in a hundred ways to the chemist. When iron is reduced by hydrogen by Quevenue's method the reduced iron is in so fine a state of division that it needs to be entirely cooled before it is exposed to the atmosphere, otherwise it is apt to take fire. But the most striking example is that which I instanced last week, and is, perhaps, worth a word of description here. Lead tartrate, obtained by precipitation from the acetate, is introduced into a small test-tube—which it should fill at least one-third—is then loosely corked, allowing just enough opening to let the vapours find their way out, and is heated over a Bunsen's burner as long as vapours pass out. It is then removed from the flame, the cork at once pressed firmly in so as to be air-tight, and the tube left to cool. On removing the cork and shaking out the powder into the air it forms a stream of fire, igniting by the time it has fallen a few inches from the mouth of the tube. This most curious property is retained for some days, or even a longer period, if the tube have been tightly corked. It is due entirely to the fineness of the division and to the large surface exposed to the action of exterior agencies. Precisely in the same way any given quantity of silver bromide or other sensitive substance exposes a larger surface to the action of light exactly in proportion to the fineness of its particles.

At the same time that this fineness of division is a most powerful factor in the production of sensitiveness, it is undoubtedly not the only one. The contiguity of a substance which is capable of taking up the metalloid combined with the silver, and so aiding in its separation from the metal, always increases the sensitiveness. This fact was first pointed out by Poitevin many years ago. Through the entire range of photographic phenomena this agency exhibits itself, and the silver haloids always gain in sensitiveness by being in contact with substances which are ready to take up the haloid. In the daguerreotype plate it is the metal underneath the film which fills this function—a fact which has been most ingeniously demonstrated by depositing a thin film of metallic silver upon a glass plate, and next iodising it so lightly that the action of the iodine is superficial only, and does not penetrate to the back of the silver film, which thus retains its metallic character and mirror surface on the side next the glass, showing as a mirror when viewed through the glass. When such a plate is exposed in the camera it is found that wherever the image impresses itself strongly the iodine released attacks the metallic silver behind it; and if the action be continued long enough the iodine penetrates the film on all the strongly-impressed parts and destroys the mirror surface, converting it into yellow silver iodide, visible by examination through the plate. The iodine at first, in combination with the exterior surface of the silver, is driven through to the back.

A little consideration will show that in this beautiful experiment any one atom of iodine may combine during the action of the light with many successive atoms of silver; under the influence of the light the silver in the film parts with its iodine to the silver immediately below. Next, the light penetrating attracts the newly-formed film of iodide, and this, again, gives up its iodine to the silver next behind it. In fact, it is quite conceivable that the process may be repeated many times in a second.

In the ordinary wet collodion process silver nitrate takes the place of metallic silver in the daguerreotype; silver having a much greater affinity for the iodine than for nitric acid this affinity comes into play to assist the decomposition of the silver iodide by light. In the dry processes organic substances having an affinity for bromine must

undoubtedly, when in contact with a bromide film, increase its facility of decomposition—in other words, its sensitiveness. If it were not so the entire chain of analogy, from the oldest processes to the newest, would be broken.

In conclusion, then, I think we must admit that the two great conditions of sensitiveness to light are—first, fineness of division of the sensitive substances; second, contact with a substance whose affinity for the metalloid will assist in its liberation.

M. Carey Lea.

DR. VOGEL'S COLOUR THEORY.

In The British Journal of Photogrpahy for January 21, 1876, page 28, there is a communication from Mr. M. Carey Lea on the subject of Dr. Vogel's colour theory, to the effect that confusion has arisen regarding the results of the experiments made by me with reference to that theory, and that my results, instead of confirming, disprove it.

Much as I respect the opinion of so experienced a chemist and photographer as Mr. Lea, I regret I cannot agree with him in this view of my results, and trust the following brief explanations will clear away any confusion which may have arisen on the subject so far as any statements of mine are concerned.

First, however, I should state that the letter to Dr. Vogel, referred to by Mr. Lea as published in the *Philadelphia Photographer*, was not intended for publication, and that on a careful re-examination of my results while writing the *résumé* published in The British Journal of Photography of the 10th December, 1875, I found it necessary to somewhat modify what I had already written to Dr. Vogel.

This *résumé*, I believe, fairly represents the results I had obtained at the time it was written, so far as they could be given in general terms and without a careful comparison of the photographed images on the stained plates with the absorption spectra of the different dyes and with similar plates unstained. These results, and others I have since obtained, are, I think, sufficient to show that my observations agree very closely with Dr. Vogel's, and that, as a rule, they tend to confirm his theory; though I would still reserve any definite opinion as to the correctness of the theory till I can obtain some collateral and convincing proof of it. Thus with red dyes I have obtained plates showing intense action in the green and yellow, with orange in the blue, with green in the red, with purple and violet in the orange. Cyanin blue, which I have lately tried, gives a very intense action in the orange between D and C, to the exclusion of almost every other part of the spectrum. This intense action in the orange was also observed by Dr. Vogel, who kindly sent me a sample of the dye.

It appears to me that whatever confusion there exists has arisen from the difficulty of understanding what is implied by the term "sensitiveness," which is used to signify *rapidity* of action in point of time as measured by the duration of exposure to produce a given effect, as well as *extent* and *intensity* of action in point of effect either with or without reference to the time of exposure. Now the effect of the dyes is to increase intensity and, in some cases, extent of action in particular parts of the spectrum, rather than to decrease the duration of the exposure as compared with an unstained plate; and it is exceedingly difficult to express adequately the effects produced by the dyes without diagrams showing the relative amount of action in different parts of the spectrum compared with an unstained plate and with the absorption spectrum of the dye.

There is, however, no doubt that by the action of the solar spectrum upon dry bromide films stained with certain dyes increased action and density are obtained in parts of the spectrum corresponding nearly with the position of the absorption band of the dye employed—generally below it or nearer the red, although the coloured films are, as a rule, not so sensitive in point of rapidity as the unstained ones. To this point, however, I have not given much attention; but, as far as my experience goes, it is the exception, rather than the rule, for the stained plates to show a similar increase of action in the parts of the spectrum transmitted by solutions of the dyes with which they are stained.

With regard to the instance cited by Mr. Lea of the action of roseine in rendering the plate sensitive to the red rays, I may explain that, although the action of the roseine in this instance was certainly to prolong the impressed image of the spectrum into the red end, as compared with an unstained plate, the principal effect was the great increase of intensity in the yellow about D, extending from about half-way between E and D to half-way between D and C. This marked band of increased action in the yellow on plates stained with roseine—though apparently opposed to Dr. Vogel's theory, the absorption band of roseine being chiefly in the green—is, I believe, in perfect accordance with his observations, and he has also explained the reason for the band of increased photographic action being more towards the red than the absorption band of the dye.

The same remarks will apply to Judson's red. The principal effect is in the yellow, though there is a distinct, but comparatively weak, action prolonged through the red to A, and slightly below.

In my letter to Dr. Vogel, and in the later *résumé* already referred to, I stated that I was uncertain with regard to the action of coralline. I have, however, since experimented more fully on this substance, with special reference to Mr. Lea's remarks, and find that, although plates stained with it are not nearly so sensitive in the yellow as Dr. Vogel found them to be, nor even so sensitive as those stained with roseine, naphthaline red, or Judson's red, they are more sensitive in the green. The strongest action is in the blue and violet region, extending nearly to F; then there is moderately-strong action to D; then a faint continuation extending on a few plates to about A (although most of the plates I have lately tried have not been sensitive much below C); and thus, although the plates stained with this substance are "sensitive in the red," as I first stated, they certainly do not show any heightened sensitiveness in that part of the spectrum.

On plates prepared with collodion, stained with coralline, and of a rich yellow or orange tint—not *red*, as used by Dr. Vogel—no traces of bands of increased action have been visible, and the action generally has been similar to that of yellow or orange dyes. On plates treated with a red watery solution of the dye, such bands have been observed about *b* E, and again just above D, the latter being generally the stronger. In some few cases the band of increased action is almost uniform between *b* and D. I cannot even now look upon my experiments with coralline as entirely satisfactory, because I have only been able to try one specimen (prepared by Jacobsen, of Berlin), and the dye is not to be obtained in Calcutta.

With regard to the action of *blue* dyes: Dr. Vogel has pointed out that several of the aniline blue dyes form an exception to his rule. In this, also, my experience coincides with his; and it was on account of obtaining almost identical results with orange and blue dyes that I was led to reserve my opinion as to Dr. Vogel's theory. That some blue dyes have the power of increasing the sensitiveness of the orange rays is shown by the action of cyanine, already referred to; and this supplies the missing link in the chain of facts required to support the theory. I hope, however, to obtain other proof during the course of my experiments, and to clear up one or two points which still seem to me doubtful. The publication of my results, illustrated with the necessary diagrams, will necessarily be a work of time.

J. Waterhouse, *Capt.*, B.S.C.,
Assistant Surveyor-General of India.

ON THE EFFECTS OF ACIDS AND ALKALIS IN CARBON PRINTING.

[A communication to the Photographic Society of France.]

Hitherto, in conducting operations in carbon printing, little attention has been paid to the influence of acids or alkalis on the water employed either in softening the pigmented paper, previous to its being attached to the paper or glass upon which it is developed, or in the development of the images; but that a most important influence is exercised the following experiments will demonstrate:—

Take a sheet of pigmented paper prepared with gelatine, sugar, and Chinese ink, with purpurine and alizarine to give it the proper tone. Let it be sensitised in a weak solution of bichromate of potash, and then cut several small sheets for exposure behind the negative in the ordinary way. Some of these papers are then immersed in pure water; others in water containing an addition of one-half per cent. of carbonate of soda; the remainder in water to which has been added one-half per cent. of sulphuric acid. These papers are each now placed on the glass coated with plain collodion; then soaked in water, and finally developed by the same water—whether neutral, alkaline, or acid—that has served to dilute them, but heated to a temperature of 100° Fah.

A very great difference is seen in the results. When the papers are immersed in the pure water they curl when first put in, and then, after they are in the water a very short time, they become flat. But if the water have been alkaline the same effect is produced in a few seconds; while, on the other hand, if the water have been acid the time in which this effect will be produced will be extended to four minutes.

There is also a marked difference in the surfaces of these papers as indicated to the touch. In the alkaline water they are pliant and

slippery; in the acid water they are hard and harsh. The alkaline papers adhere better to the glass, whilst the acid papers require repeated and considerable pressure before they will adhere.

But it is in the development that the difference is shown in the most striking manner. The alkaline papers, after the application of hot alkaline water, almost immediately become detached from the glass. The neutral papers require much longer time, and the acid papers a very much greater time still, before the same result is produced.

It is the same with the development of the images by the dissolving away of the coloured gelatine; the images on the alkaline paper are developed very quickly, whilst the acid papers occupy six times as long. But the alkaline water tends to produce, and often does produce, if the alkalinity be too strong, a granular appearance in the image analogous to that of a filament completely concealed, and when the image is dry it is rough to the touch; but in proportion as the alkali is reduced so does this effect disappear.

The images developed with the acid water are very fine and transparent, but it is difficult to completely dissolve away the whole of the pigmented gelatine. This is very curious, showing that the formation of the picture is profoundly modified by the acid water. The resulting picture has a different molecular formation with the acid compared with what it has when prepared by the aid of the neutral or alkaline water. Generally speaking the images developed with the acid water tone much darker. These results are the same whether alkali or acid be used in the bichromate of potash bath.

For these experiments we have operated with three baths—the first acidified with sulphuric acid; the second prepared with ordinary water; and the third with the addition of carbonate of soda. In the acid bath the pigmented paper is hard and rough. It ought to be immersed not less than six minutes (at a temperature of 120° Fah.) in order to become saturated. Five minutes will be required for a similar degree of saturation in the alkaline bath, and a little longer for the bath prepared with ordinary water. In the course of these operations the effects we have described are very palpably presented. We have ascertained the most favourable conditions for success in the ordinary practice of carbon printing. The following are these conditions:—

The Sensitising Bath.—To a solution of bichromate of potash, in the proportion of ten litres (seventeen and a-half pints) of water and three hundred grammes (nine ounces) of bichromate, add five cubic centimetres (eighty-five minims) of liquid ammonia.

The Immersion Bath.—For softening the pigment paper before attaching it to the support upon which it is developed, to each five litres (about nine pints) of ordinary water add two cubic centimetres (thirty-four minims) of liquid ammonia. It is sufficient that this water bring back slowly to the original blue a slip of reddened litmus-paper when immersed in it.

Development.—For the water to be employed in development it will suffice that ammonia be added in the same proportion as that required in the operation immediately preceding.

Transparencies.—For transparencies on glass the water must be acid, one part of sulphuric acid per thousand parts of water being the proportions which seem to give the most sharpness. I prefer the use of ammonia to that of soda or potash, because the latter often precipitates the lime contained in common water.

It is desirable that every photographer should be acquainted with these conditions of success. The process of carbon printing seems difficult to many persons solely because the conditions under which successful operations are conducted are not properly understood.

D. Van Monckhoven

ON THE FADING OF SILVER PRINTS.

I have read with much interest from time to time the remarks and suggestions of yourselves and others as to the cause of the fading of silver prints; and, as the question is of vital importance to the public and the profession, it becomes the duty of everyone engaged in photography to endeavour as far as possible, from information or experience, to throw what light they can on this the greatest puzzle of their art.

What is a puzzle still was a puzzle many years ago, namely, why some prints from the same ream of paper—all silvered, toned, fixed, and washed alike—have faded and some have not. I have tried many experiments, extending over as many years, to discover the cause. I have tried all sorts of mountants and all sorts of cards; have washed the prints so thoroughly that it was impossible a trace of hyposulphite of soda from the fixing bath could have been left in the paper; have boiled the prints in distilled water, evaporated the solution to the smallest possible quantity, leaving sufficient only for successful analysis, and have found no trace of free hyposulphite of soda by the most delicate tests; still some of these prints faded—even unmounted—when exposed to light and moisture. Some showed a change sooner than others under the same conditions, while others showed no appearance of fading.

Supposing still that a trace of hyposulphite of soda might be left in the prints and cause the change, various chemicals were tried to get rid of it—among others, chlorine water. I mention this more particularly as the effect was curious. The whites of the picture became discoloured on exposure to light, proving that there remained a salt of silver in the paper that had not been affected by the light during the process of printing, and that was *insoluble in hyposulphite of soda.* This fact can be proved in another way—by silvering a strip of albumenised paper, keeping it in artificial light during the process of fixing and washing, then applying it moist to the end of a test tube where hydrosulphuric acid is being generated, when, after a short time, a yellow disc will be produced on the paper more or less deep, showing that a silver salt was present in the paper that was not soluble in the hyposulphite of soda, and had combined with the hydrosulphuric acid, forming sulphide of silver.

Is it albuminate of silver? If so, then the sooner a solvent for albuminate of silver that will not destroy the colour of the print is found the better; yet, although I do not think this insoluble salt of silver is the cause of the fading of the prints, still you will observe that it is in the whites of the picture that the yellowing first appears.

Believing still that hyposulphite of soda had something to do with the fading I set about examining the various samples of paper at hand—Saxe, Rive, and home-made. In all the samples examined traces of hyposulphite of soda were found in more or less quantity, and sufficient to form sulphide of silver in the paper when it came into contact with nitrate of silver. The formation of this sulphide of silver is, in my opinion, the cause why some samples of paper so rapidly discolour on being kept, depending upon the quantity of hyposulphite of soda present in the paper. I have seen the nitrate of silver bath become of a deep red colour after silvering a few sheets of some paper, and the paper itself get so brown in half-an-hour or so as to be quite useless for printing purposes. Other samples of paper not only did not discolour the bath, but remained white a long time—for some days—even in hot weather. The mere presence of organic matter in the bath does not account for its getting discoloured, because where paper albumenised with stale albumen is used, which, in consequence, has lost its property of coagulating in nitrate of silver and dissolves off the paper in the bath—in some cases entirely—still the bath did not get red sooner or the paper discolour quicker in consequence of the accumulation of organic matter. If albumenisers of paper would use only fresh albumen, and paper-makers thoroughly wash the pulp free from bleaching chlorides and antichlor, all other things being equal as to purity, I see every reason to expect silver prints to be permanent.

As Saxe and Rive papers are sized with starch I do not suppose sulphurous acid is used in the manufacture, as is the case with gelatine-sized papers by home manufacturers; therefore the presence of sulphurous acid in the paper did not cause the reaction with the various tests applied in these experiments—namely, acetate of lead, iodide of starch, and permanganate of potash. If a trace of a solution of sulphurous acid be added to a weak solution of permanganate of potash the purple colour is discharged entirely, leaving the solution clear. With a solution of hyposulphite of soda the purple colour is discharged, but the tested solution becomes a dirty yellow with a flaky brown precipitate. This reaction I have tried with pure hyposulphite of soda as well as the commercial article. A weak solution of nitro-prusside of sodium shows no immediate change by hydrosulphuric acid; but after some time it becomes purple, which gradually fades, leaving the solution slightly yellow. With hydrosulphate of ammonia the characteristic reddish purple is produced, which also gradually fades, leaving the solution green. With hyposulphite of soda there is no immediate change, even on boiling, but it becomes green after a time. With sulphurous acid no change takes place in the cold, but on boiling the solution becomes a permanent blue—at first faint, but gradually deepening.

Such are some of my experiments in search of what may be called the "photographer's elixir of life;" and in giving them I wish to stimulate others to investigate this important matter. Carbon prints are pretty and a novelty; but they are not to be compared with silver prints either for beauty or certainty of production. Gelatine is of a physically unstable character; by too often heating at a high temperature, like albumen when decomposition has begun, it becomes soluble in cold water; and even when tanned, so to speak, with alum we have no experience to the contrary that in the presence of moisture and decomposing agents it may not rot and crumble to dust.

Although silver prints may be said to be at a discount as to permanency, I still believe that were greater care observed as to the purity of the materials in the manufacture of the paper and subsequent albumenising we would have silver prints as permanent as carbon is likely to be. Some silver prints are as fresh to-day as they were twenty years ago. Why? That the sulphite or hyposulphite of soda used to neutralise the chlorine in the paper pulp plays an important part in the fading of the finished print I have no doubt. It is possible that sulphide of silver formed in the process of silvering, from the presence of hyposulphite of soda in the paper, may by *contact*, and in the presence of light and moisture, excite a chemical action and convert the suboxide of silver forming the picture into sulphide, and sulphide of silver by the same agency be converted into sulphate.

Let the importance of the subject be my apology for troubling you. John Lamb.

GOSSIP ABOUT GLASS ROOMS.

Some years ago the writer of this paper devoted much time and thought, with many experiments, to the subject of glass rooms and lighting the sitter. He found it by no means the simple matter many seem to consider it. Intimately allied with chemical, artistic, and optical conditions, either of these elements were found to exercise varying influences in connection with it.

Bad photographs were produced with the best possible light in well-constructed rooms properly located; on the other hand, really fine, artistic productions were seen taken in ordinary sitting-rooms, in which all sorts of ingenious dodges, in the way of screens and reflectors, were required to make up for defective means of lighting the sitter.

One operator, by the careful study and attention he had given to the chemistry of his art, produced clearly-defined and seemingly well-exposed negatives in a feeble, diffused light, in which ordinary operators could never have produced a picture worth looking at. Another, by his optical knowledge, utilised a glass room which might otherwise have been utterly useless, making every particle of the little effective light he could obtain do its work with the utmost intensity of its power, and so on.

But the amusing part of these remembrances consists in the curiously-contradictory opinions which existed. He who succeeded by virtue of his chemical knowledge said it was all nonsense to talk of the glass room's construction and plan as the real source of success, because it all resided in the operator's artistic knowledge. His photographs were amongst the best I have ever seen, so far as regarded their purely photographic merits, and they were also beyond all necessity of demonstration the most inartistic!

He who could geometrically demonstrate the fact that his success was due purely to the form of his glass room, which brought to a focus upon the sitter all the little light available from the peculiarity of its situation and the tall buildings surrounding it, regarded delicate chemical conditions as matters of profound indifference. Given the room, he would use anybody's chemicals, if they were in decent working condition, and produce the same results.

The artist whose photographs were so good and artistic, and whose models were photographed in an ordinary sitting-room—a lady—held that, with usual care and ordinary processes and apparatus, the quality and amount of the light was a matter of comparatively small importance. She held that success or non-success was due purely to the presence or lack of artistic knowledge of light and shade in connection with photogenic action. "Let the head of the sitter appear," said she, "upon the focussing-screen with the features properly relieved by well-defined lights and shadows, the most prominent receiving the light at its strongest, and the least prominent being kept back by delicate half-tints; let even the deepest shadows be more or less full of reflected light from strong reflecting surfaces not too far from the model, and with the chemicals in a fairly decent condition as regards sensitiveness the developed image would inevitably be photographically and artistically good." This was her photographic creed, in which she firmly believed.

The bad photographs referred to as taken in good light were so common and numerous, and due to so many different causes, that it is scarcely necessary to speak of them; all are familiar with them. They failed from a want of chemical knowledge, lack of manipulative skill, optical ignorance, and the absence of artistic taste or feeling—sometimes from one, sometimes the other, sometimes from all together, and sometimes from the operator being lazy or careless. But in each case the bad workman found fault with his tools, and in nine out of ten cases be laid the blame upon the light.

It is necessary—as some experience which the writer had long ago demonstrated—here to pause and state that all the gentlemen referred to indirectly in the foregoing statements are dead, and, consequently, cannot come from the grave to be angry with him on account of these remarks. He has killed them all, lest what he had to say about them might hurt their feelings. They have living representatives perhaps, and to them he may observe that they—the dead photographers—were all right and all wrong.

A good glass room is of primary importance, even if excellent photographs can be produced in a bad one. Chemical conditions are not less important, even if a first-class light tides over the difficulties arising from such conditions not being at their best. Artistic skill with ordinary photographic experience will do wonders even in a bad light; but, nevertheless, a good light will amazingly increase such wonders. And a really scientifically-constructed glass room, perfect in its optical conditions, is the crowning glory of the skilful chemist and tasteful artist's best work.

Holding such opinions I am glad to see that clever men are still devoting their attention to new studios. I long ago said in the photographic journals, and at some length, all I had to say of any practical value upon this subject, and I am not about to repeat it, but now write mainly to urge upon the readers of our good old British Journal of Photography—it is the oldest journal friend we have—the importance of this subject. Followers of the type of thinkers previously described still pooh-pooh it as of inferior consequence, and use for arguments the facts to which I have given prominence. Do not listen to them. Their arguments, taken altogether, only demonstrate the wide field of power open for our use in each elementary field in chemistry, in optics, in art, and in mechanical skill, although, taken singly, they may appear to tell one against the other. Combine them in your practice, and the result cannot but be gratifying to photographers themselves, delightful to their patrons, and beneficial to our art. A. H. Wall.

ON THE DIFFERENCE BETWEEN CARBON AND COLLODION TRANSPARENCIES FOR ENLARGEMENTS.

[A communication to the South London Photographic Society.]

In making transparencies for the reproduction of negatives, large or small, the photographer has two methods at his disposal, viz., by the carbon process, or by one or other of the silver processes. In saying "silver processes," perhaps it will be as well just to state what these are. Well, to begin with: there is wet collodion and pyro. developer, and wet collodion and iron developer. Then there are the innumerable dry processes and the albumen process, which all depend upon a latent image being developed by the deposition of silver on the parts acted upon by light.

Now, for the production of transparencies for enlarging from, it is necessary that the image shall be textureless, or as nearly so as possible; that the deposit shall be as homogeneous as possible; that the whole of the detail, in both shadows and lights, shall be reproduced precisely as in the original; and also that there shall be no loss of sharpness. When everything is in harmony—the chemicals, light, &c.—with iodised collodion and pyro. development it is possible to get all these conditions, but the uncertainty is very great. The same may be said of the albumen process. As for the dry process, I fancy professional photographers are too dignified to mess about with dry processes; therefore I will pass on to the process most used by photographers when they do their own enlarging, viz., the ordinary wet process.

Transparencies by this process have only one good quality, and that is, they can be produced without going out of the ordinary routine of business; else they are difficult to get without texture. Hardly two pictures can be secured which will have the same amount of deposit, and which graduates from fine sand in one to boulders in another (that is, under the microscope). If, however, the light, chemicals, and exposure happen to be all right, then the transparency may fulfil these two first conditions, being of good texture and the deposit fine; but under no circumstances can a collodion transparency compete with one in carbon, in the matter of detail in lights and shadows. If the exposure have been sufficient to get the half-tones in lights well covered the shadows are gone (because of the light); and if not properly covered then the shadows are mere blotches.

And now, having described to you the faults existing in wet collodion transparencies, I will show you some transparencies done in carbon, from which I would undertake to do what I have often

tried to do with collodion transparencies, viz., reproduce negatives (same size) that were as good as the original negatives; and that may be considered as the best test a transparency can stand,

W. T. Wilkinson.

ON THINGS IN GENERAL.

"The cry is still—'They come!'" More studios on improved principles, more glass roofs with sides to match, to "minimise exposures," and render the hitherto impossible, &c., &c. I have not yet seen any glass chimneys recommended for studio roofs. They only are wanted to complete the tale!

I should not have thought it possible that there was one man left brave enough or foolish enough to bring out another patent for a glass room; and yet I see a gentleman known for producing some of the best work in the kingdom—Mr. Slingsby, of Lincoln—has added one more to the list. The very fact of his doing good work will, however, stand him in good stead. If he only send an intelligent canvasser round the country with his beautiful pictures he will find plenty ready to see that the want of a suitable room has been just the one only thing that has prevented them arriving at fame and fortune. The fact that the new room is only composed of two galleries stuck together endwise, built exactly on principles recommended in these pages years ago, will not in the least degree militate against its success. The Patent Office should thrive on these matters alone almost. I should think that to have to overhaul all such specifications, a good deal of amusement will be afforded to the Attorney-General or his substitute in what it appears to me must, to any man of taste and artistic feeling, be otherwise a dreary occupation.

But a true poetic soul can find beauty and poetry in everything around him—a thought that struck me in a very forcible manner last week when, in looking into the periodical, *Nature*, I saw the beauties and peculiarities of what to the ordinary mind would appear the most unpoetical of themes sought out and treated in flowing, melodious verse. The poem was on "Screws!"

I hear another department is being added to the Patent Office; it is neither more nor less than a photographic establishment, to be devoted to the copying of plans, drawings, &c., of budding patentees.

The inception of this new establishment occurs just at the right moment to allow of its being constructed under the most modern lights. There would not now seem to be any great difficulty, by means of a judicious combination of improved studios, pellicles—gelatino or collodio—and methylal and collo-developers, sagaciously blended with an entirely new system of photography, in obtaining pictures without any exposure to light whatever; of course with the aid of the grandest and latest discovery of all, which, no doubt, will revolutionise the art (I am already preparing plans for converting my little place into a greenhouse and doing all my work in the dark room), as—thanks to Professor Vogel—we have only to stain our plates of a peculiar red, and our silvered paper of a similar hue, to be able to work in a yellow light, which, indeed, he tells us, we shall find *quicker* than the blue. I would seem to have been overhasty in penning my reclamation (that, I believe, is considered the correct word to use now; what a different meaning it used to have a year or two ago!) with regard to the film-staining question. But no one seems to be able to hit the exact shade but the Professor himself. Is it possible? Can there be a hitch? I do not want to part mental company with an F.R.S. *in posse*, if I can help it. I shall defer the greenhouse arrangement.

None of these processes, though, seem to be able to dispense with the use of the precious metals, so that we shall still have to pay dear for our whistle. A correspondent a week or two back seems, however, to have had experiments tried upon him in this direction even; for in place of platinum solution he appears to have had foisted upon him some hydrochloric acid dashed with a *soupçon* of platinum—an experimental refinement which our Editors do not seem to have reached yet. But the correspondent is getting into good hands, for I learn that some one has taken him in hand who is no stranger to the concocters of this sort of rubbish. "You can tell a man by the company he keeps;" fortunately I have escaped such company and its contagion so far.

Not to run away from my subject, the precious metals—I find they are sufficiently expeditious in their own account in parting company with me—I must bestow a passing notice on an article in the *Photographische Mittheilungen* regarding residues. I learn from it that on the continent it is the custom to sell residues, paper cuttings, chlorides, &c., right out at so much a pound. This may be a convenient plan—it shows a loving trust in human nature—but it cannot possibly be an economical one to the photographer, seeing that the refiner must leave a margin for possible deficiency in, say, purity of his chloride or other precipitates. I daresay I am not at all orthodox, but, in my opinion, it is far better to send your residues to the refiner and let him reduce them and pay you in cash or in kind. His terms will not average above six per cent. on the gross value; that is to say, about a shilling on a Winchester quart of bath. If any doubt as to his honesty exist an assay may be made beforehand.

There have recently appeared from our continental neighbours comparative statements as to the cost of silver printing and carbon, in which the money required to produce a similar number of pictures by either method is almost identical; but the item of labour is left out. I remember having seen it stated somewhere that it takes a greater number of hands to get through a given number of prints in carbon than in silver in any one day. If this be so the balance of advantage as regards cost is largely in favour of silver. But, individually speaking, I do not think the cost will have any but the most trivial effect on the result. If carbon turn out to be as easy and as good as silver, and is permanent, it would be adopted if it cost twice or thrice as much.

There seems to be a wonderful freemasonry among photographers, or else a marvellous power of push in the *entrepreneurs* of processes; for I find that the great patent system of producing pictures by the aid of a book about screens, by M. Klary, is in full blaze of popularity at Philadelphia, while one of the new-old zigzag window studios has been erected in Copenhagen amid a flourish of trumpets. It is getting time for a new sensation from abroad to be worked up in our own country.

The papers recently have tumbled into a "mare's nest" in some account that has gone their rounds about the ignition of a billiard ball by a chance light from a cigar. "New infernal machine," "new torpedo," and suchlike, are the expressive terms used to graphically describe the danger of this new material, which seems to be only our old friend parkesine in a new coat. I very much doubt the probability of the combustion having taken place at all; it is not the easiest matter to set fire to parkesine even if one try specially to do so. If it were not so I should say to all with false teeth in their head—"Beware!" for at the present time a material to imitate the natural gums is being largely made and introduced; it is used to attach the teeth to, and is composed, in the main, of pyroxyline coloured with a suitable pigment. Imagine the effect of a spark from a cigar dropping upon a set of teeth bound in this remarkable substance. It is too horrible to contemplate if all this fiery reality belonged to it. But I think I may safely say that there is not one iota of danger, under any circumstances, in connection with these useful appendages, and nothing but determined effort would inflame them at all. It is, nevertheless, a fact that a serious explosion has resulted from the use of this new artificial gum. A set of teeth constructed upon it were taken to a dentist to repair. Unfortunately, he took it to be vulcanite, and upon subjecting it in a closed vessel to heat in the usual manner, at a certain stage of the process the teeth foundation exploded and shattered his apparatus to atoms.

I do not hear of many trials abroad with the gelatino-pellicle process, and it seems a pity, for it appears to be the next promising of all the new processes; but, if the experience of a new contributor to this Journal, signing himself "Franklin," is to be taken as a guide, there is much to be dreaded in starting to work. Only imagine, dear reader, getting through several acres of negatives before attaining experience! No doubt, however, this is jocularly meant, and we are all much obliged to Mr. F. for his very interesting and explicit article.

Free Lance.

THE REDUCTION OF PHOTOGRAPHIC RESIDUES AS PRACTISED IN GERMANY.—TO SELL OR NOT TO SELL?

At a recent meeting of the Berlin Photographic Society there was rather a lively discussion on the subject of the most profitable mode of disposing of photographic residues; but, though some thought the least troublesome—namely, selling them—was also the most profitable way, and others thought better of bringing them to chloride of silver, while others, again, recommended having the silver recovered from the waste by a chemist at the owner's expense, no one seemed to have any very precise data for his assertions except Dr. Weissenborn, and the prices he quoted as being paid for residues were questioned.

At a subsequent meeting the matter was revived by a chemist of ten years' standing, Herr E. Schmid, of Aarau, who has had a good deal of practice in reducing residues, and gave the result of his experience in a communication to the Society.

Though nothing strikingly new was brought out by the discussion in question, still it will not be out of place to give the gist of the paper which evoked the discussion, as the reduction of residues is a subject of great practical interest to photographers, and the opportunity of comparing our own results in that way with those obtained by other people is useful, especially so when those other people are German photographers, many of whom are practical chemists. Some time ago there was a rumour that Dr. Vogel was about to publish a simpler method of reducing residues than any yet known, and when we saw that the method lately recommended by THE BRITISH JOURNAL OF PHOTOGRAPHY was condemned as too complicated by several prominent members of the Berlin Photographic Society, and amongst them by Dr. Vogel, we hoped that at length the new method was to be revealed; but it seems we must exercise patience for a short time longer.

Herr Schmid commences by saying that before expressing any opinion upon the main question one would require to know approximately the actual value of the residues to be worked up. Theoretically, 100 grammes of dry chloride of silver should yield seventy-five grammes of metallic silver, but, practically, photographers find that they will not get nearly so much from their chloride of silver. In support of this assertion Herr Schmid gives the results obtained by him from seven samples, showing that the actual yield is from twelve to forty per cent. below the theoretical amount:—

Chloride of Silver.		Metallic Silver.		Theoretical Silver Contents.	
1.— 295	grammes	gave 190	grammes.	217	grammes.
2.— 560	,,	385	,,	420	,,
3.— 410	,,	195	,,	307	,,
4.— 605	,,	380	,,	453	,,
5.—1500	,,	680	,,	1125	,,
6.— 480	,,	260	,,	360	,,
7.— 690	,,	465	,,	517	,,

The cause of this great shortcoming is that, as a rule, photographers, not being accustomed to the work nor understanding exactly what is required, do not bestow sufficient care upon the preparation of the chloride of silver, so that all sorts of substances which are nothing less than chloride of silver get mixed up with it, and this mixture on being reduced yields a result far below what was expected. The value of metallic silver being about 160 marks per kilogramme (160 shillings for about 2½ lbs. avoirdupois) the theoretical value of a kilogramme of chloride of silver would be reckoned at 120 marks, while, as shown by the above table, its actual value often sinks as low as seventy-three marks per kilogramme.

If the value of chloride of silver be variable, a moment's reflection will show that that of the paper trimmings is still more so, depending in a great measure, as it does, upon the quantity of unfixed paper and filter paper present; parings of fixed paper are often almost worthless. The following table gives the proportion of metallic silver contained in the ashes of eight different lots of paper parings:—

			Metallic Silver.			
1.—3,750	grammes of ashes	gave	1,302	grammes,	or 34·7	per cent.
2.— 770	,,	,,	235	,,	30·5	,,
3.—1,250	,,	,,	500	,,	40·	,,
4.—1,220	,,	,,	730	,,	59·8	,,
5.—1,720	,,	,,	855	,,	49·7	,,
6.— 760	,,	,,	30	,,	3·9	,,
7.— 400	,,	,,	45	,,	11·2	,,
8.—1,050	,,	,,	110	,,	10·5	,,

The ashes of Nos. 1 to 5 were obtained from unfixed parings, and show a proportion of silver of from 30·5 to 59·8 per cent. in the ashes treated, being a variation of 29·3 per cent. The ashes of Nos. 6 to 8 inclusive were obtained from fixed parings, and contained from 3·9 to 11·2 per cent. of silver, being a variation of 7·3 per cent. Ashes such as No. 6 are not worth working up, as the cost exceeds the value of the silver obtained.

Having thus come to an understanding as to the usual silver contents of residues, Herr Schmid goes on to consider the position of the photographer who has his residues reduced at his own cost by the house that usually supplies him with chemicals, and receives in return either an equivalent in nitrate of silver or a sum placed to his credit. The manufacturer in this case, having already had his profit on the articles furnished to his customer, reduces his waste for him and is contented with a small profit. For small quantities it is usual to make a charge of eight marks per kilometre of metal reduced, and for large quantities a charge of four marks per kilo. in addition to the actual cost of the reduction, so that, taking the value of a kilo. of metallic silver at 160 marks, the owner of the residues gets from 144 to 148 marks per kilo.

Herr Schmid then goes on to consider the case of the photographer who sells his residues; and, in order to understand it exactly, he purchased several samples of residues from photographers at the usual prices paid by the wholesale merchants, and reduced them with the following results:—

	Marks.
1. For eight kilos. of paper cuttings, at 6·5 marks per kilo., was paid	52·
From that 800 grains of ashes were got, and from that again 490 grammes of metallic silver. This silver, after deducting the cost of reduction, was sold at the rate of 146 marks per kilo., so that for the 490 grammes they got 71·5 marks, being a profit of 19·5 marks	71·5
The photographer was thus paid at the rate of 6·5 marks per kilo. of cuttings, which was but 106·12 marks per kilo. of metallic silver, so that he suffered a loss of 39·88 marks per kilo. of silver, or 2·43 marks per kilo. of paper cuttings.	
2. Three kilos. of paper cuttings, at eight marks per kilo. ..	24·
Result: 320 grammes of ashes; from that 255 grammes of metallic silver, for which 144 marks per kilo. was obtained, or 36·72 for the 255 grammes. The actual amount per kilo. of metallic silver was 94·11 marks, being a loss of 49·88 marks per kilo. of silver, or 4·26 marks per kilo. of paper trimmings	36·72
3. Fourteen kilos. of paper trimmings, at 5.5 marks per kilo.	77·
Result: 1,720 grammes of ashes; from that 855 grammes of metallic silver, for which, at the rate of 148 marks per kilo., the sum obtained was	126·54
The result was a loss to the vendor of 67·94 marks per kilo. of metallic silver, or 3·54 per kilo. of paper trimmings.	
4. 625 grammes of chloride of silver, at 96 marks per kilo. ..	60·
Result: 410 grammes of metallic silver, at 146 marks per kilo.	59·86
So that 3·6 marks too much per kilo. was paid for the metallic silver.	
5. 690 grammes of chloride of silver, at 100 marks per kilo. .	69·
Result: 425 grammes of metallic silver, at 146 marks per kilo.	62·5
Obtained for the kilo. of metallic silver contained, at the rate of 162·3 marks per kilo. of chloride of silver, so that 9·1 marks per kilo. too much was paid for the chloride of silver.	

Putting together the results of all Herr Schmid's purchases up to the present date they were mostly similar to the above, though few were so unfortunate as 4 and 5; on the contrary, there was usually a profit of from three to four marks per kilo. on chloride of silver, and on the ashes of paper trimmings a profit of from thirty to sixty per cent., so that, on the whole, the buyers of residues do not make such a bad thing of it. His conclusion, based on the foregoing data, is that when a photographer has sufficient chemical knowledge to admit of his determining the contents of his residues, it is indifferent whether he sells them or has them reduced at his own expense, as he knows exactly what he sells; but for one who does not possess the requisite knowledge the better plan is to get them worked up for him at his own cost and the result placed to his credit in the books of the manufacturer with whom he deals, as the percentage charged by the latter will be small in comparison with what he is likely to lose by selling outright. Though in this case the reduction of the residues at the owner's cost is not so profitable directly to the manufacturer as buying them, still, if he lay himself out to oblige his customers, and values their residues justly, he will in all probability reap his reward indirectly by the extension of his connection.

Meetings of Societies.

SOUTH LONDON PHOTOGRAPHIC SOCIETY.

THE usual meeting of this Society was held on Thursday, the 11th inst., —the Rev. F. F. Statham, M.A., F.G.S., President, in the chair.

Mr. T. S. Hicks was admitted a member. Mr. C. A. Ferneley exhibited a number of views taken in Australia.

Mr. W. T. WILKINSON then read a short paper *On the Difference Between Carbon and Collodion Transparencies for Enlargements.* [See page 235.] A number of transparencies by the carbon process, intended for use in the production of enlargements, were exhibited in illustration of the paper.

After a few remarks by the Chairman,

Mr. J. T. TAYLOR said that the carbon transparencies exhibited were very fine, although they were inferior to those that might be obtained by the albumen process or by gelatine emulsion, in neither of which would there be the same surface inequality observed in those on carbon, in which the sudden transition from light to shade was attended by a considerable difference in the thickness of the film. With respect to the statement that professional photographers were too dignified to "mess about" with a dry process, he thought that a very different and much more correct reason than "dignity" could be assigned as the cause of dry processes not being practised; but, out of deference to the feelings of the professional members present, he would refrain from hinting at the true reason.

Mr. WILKINSON observed that the ridgy transitions from light to shade which caused unequal thickness in the transparency did not interfere at all with the production of sharp enlargements. He regretted the absence of Mr. Brooks, who was to have exhibited transparencies by the collodion process.

Mr. BRIDGES remarked that he had seen Mr. Brooks engaged in the production of transparencies by the collodion process, and could bear

testimony to the excellence of his work and the fineness of the deposit when examined under a high magnifying power.

Mr. WILKINSON claimed for the carbon process a greater certainty in obtaining uniformity of results than could be obtained by any other process.

Mr. F. YORK was in the habit of producing transparencies by the wet collodion process in great numbers, and such was the uniformity of the results that among sixty transparencies taken in a day from one negative there would be no recognisable difference.

Mr. G. W. SIMPSON said that this proved that the production of transparencies by collodion was attended by as great uniformity of result as that by the carbon process when both were practised under similar conditions.

Mr. L. WARNERKE inquired whether such a fine texture as that spoken of by Mr. Wilkinson were really necessary. He asked this because he understood that the tissue of M. Lambert was made very granular, as that artist alleged that he obtained better results from a carbon tissue of that character.

Mr. WILKINSON had never seen any of M. Lambert's transparencies; hence could not speak as to their quality.

Mr. J. S. TULLEY considered that transparencies made by an albumen process, such as that of Edwards, were much finer than any by the carbon process that he had ever seen.

Mr. E. W. FOXLEE said that, notwithstanding what had been alleged by Mr. Wilkinson respecting the disadvantages of wet collodion, it was certain that, with a neutral bath and pyrogallic developer, pictures of exceedingly fine texture could be obtained with perfect certainty. But there was no process which, for uniformity of results combined with certainty and quality, could surpass the albumen process. The carbon process, in the hands of the few who had become intimately acquainted with the best method of working it, yielded transparencies of exceptional excellence; but he was of opinion that the best method of working it was not adopted by photographers in general.

Mr. TAYLOR inquired if there was not some secret connected with the way in which the Autotype Company produced the transparencies employed by them for enlarging.

Mr. WILKINSON said that the process was published in the Company's *Manual*.

Mr. TAYLOR was well aware of what had been published, but he would like to know whether either Mr. Wilkinson or Mr. Foxlee, both of whom were connected with the Autotype Company, would undertake to say that the full details of the method by which the transparencies exhibited at that meeting had been published.

Mr. FOXLEE said that the Autotype Company did possess a special knowledge of the best methods and conditions by which to produce transparencies for use in enlarging, and that such knowledge—secrets, if they chose to call it so—was not possessed by the public generally.

Mr. BRIDGES observed that practically it amounted to a secret process, although the public was made aware of the nature of all the *matériel* employed. It was of no use to put forward the transparencies exhibited that evening as specimens of what the public might be expected to produce if they worked with certain *matériel*, seeing that they were done by the Autotype Company, who were superior to any others in that kind of work.

It was suggested that the first meeting of next session be devoted to the subject, and that Messrs. Wilkinson, Foxlee, and Brooks be requested to demonstrate the value of the various processes severally advocated by those gentlemen.

A vote of thanks was then awarded to Mr. Wilkinson.

A desultory conversation on Mr. M. Carey Lea's collo-developer then took place, in the course of which Mr. York stated that he had found no benefits to accrue from its use; a similar opinion was expressed by Mr. Dunmore.

The remainder of the evening was occupied in the discussion of private business connected with the library.

At the next meeting a paper *On Obstacles to Photographic Progress* will be read by Mr. Aldridge.

EDINBURGH PHOTOGRAPHIC SOCIETY.

THE first outdoor meeting of the season took place on Thursday, the 11th inst., in the grounds of Craigie Hall, the property of Mr. Hope Vere, but at the present time occupied by the Rev. Mr. Cooper. The morning looked somewhat dull and threatening, but notwithstanding that rather more than the usual number of members appeared at the rendezvous. A proposition to postpone the excursion was made by some of the more timid members; but as faith in the "clerk of the weather" was loudly proclaimed by the more enthusiastic the proposition was not entertained, and the party drove off in capital spirits at ten o'clock.

A halt was made at Cramond Bridge Hotel, where it was intended to put up the horses, and to walk the remainder of the distance, but on learning that ample stabling existed at the house it was resolved to drive all the way. On arriving at the principal entrance gate it became evident that Craigie Hall is not often visited by such large, or probably such Bohemian-looking, parties, as they were assured by the lodge-keeper that they had made a mistake, and that it must be Dalmeny to which they intended going. The exhibition of Mr. Cooper's letter, however, put matters straight, and served as an "open sesame." After a pleasant drive through a pretty avenue of trees just bursting into foliage the camping ground was reached.

Craigie Hall lies from four to five miles north-west of Edinburgh, on the banks of the Almond, and is well wooded, some of the trees—especially some large geans at this season, when they are fully in blossom—being well deserving the attention of the photographer. The house itself is not worth a plate. The glory of the place, from a photographic point of view, is the river Almond, and especially that portion which lies in front and a little to the left of the house. Here it takes a slight bend and spreads out to a considerable breadth, and being shallow and freely supplied with large boulders very fine effects of light and shadow are easily procured. An additional charm is given to the picture by a fall of three or four feet, over which the water flows and then rushes with considerable rapidity amongst huge masses of rock. On the left, looking up, the bank is high and precipitous, and clothed with trees in considerable variety; and on the right, high above the stream, is erected a rustic summer-house, with high-peaked, thatched roof, and ornamented rather grotesquely. Some hundred feet below the fall the river is crossed by an old stone bridge, of a style of masonry sufficiently irregular to enhance the effects in any picture of which it may form a part; while below the bridge, although somewhat difficult to get at, there are a succession of charming points from which good "bits" may be got.

By this time the gloom of the morning had given place to brilliant sunshine; and as there was hardly sufficient wind to stir the leaves of the silver birch, it seemed as if all nature had conspired to afford the much-desired opportunity for successfully inaugurating the outdoor meetings of 1876. In a short time cameras were unpacked and tripods set up, and each member of the "working party," selecting for himself the points of view which pleased him most, "fired away" as if determined to make up for the lost time consequent on the dreary months of a Scottish winter.

It will, of course, be evident that in a locality where so many fine points may be secured without scarcely moving the tripod a large number of plates may be exposed in a comparatively short time, and consequently a halt was called at an early period of the afternoon, as one at least was wanted for a group, and one or two for the "auld brig" at Cramond.

Mr. Panton and Mr. Crichton then grouped the members under the spreading branches of a fine old gean tree, and each exposed a plate, in full confidence that a rapid rectilinear would, in about forty seconds, give a good negative on beer-and-albumen.

The party then moved on to Cramond, and photographed the old bridge and several other interesting "bits," including Jock Howieson's house. As the hour was yet early they spent the remainder of the time in a pleasant stroll down the banks of the river—some engaged in "prospecting" with a view to future visits, while others of a technical turn of mind visited several of the industrial establishments which owe their existence to the motive power furnished by the river. At one of these establishments much interest was excited in a new or, at least, modern method of turning the wooden shafts for shovels, including the bend close to where the shaft enters the iron socket; and at another in watching the process of paper-making by hand—probably the only place in Scotland where that operation is carried on in the old-fashioned way.

An adjournment was then made to the hotel, where a pleasant half-hour was spent in discussing the probabilities, or, rather, the certainties, of success, as, curiously enough, with the exception of a single emulsion plate, all were by the beer-and-albumen process.

By this time the horses were at the door, and the party started for home, all highly pleased with the first outdoor meeting, an arrangement being made to show the results at the ordinary meeting of the Society on the first Wednesday in June.

GLASGOW PHOTOGRAPHIC ASSOCIATION.

A MEETING of this Association was held on the 6th inst.,—Mr. John Urie in the chair.

The first business transacted was the nomination of office-bearers for next season, and Mr. Parker and Mr. Mactear were appointed auditors.

The following committee was appointed to carry out Mr. Urie's motion to oppose the renewal of Swan's patent, viz., Mr. Mactear, Mr. Bowman, Mr. Urie, and Mr. Bell.

Mr. Mactear showed a Dallastype copy of a large sheet of printed matter, the copy being only one-sixth the length of the original and beautifully sharp.

Mr. Tilley, of Stafford, was present, and explained his patent for taking combination backgrounds. He had a model studio, which enabled him to give full details.

Mr. GILFILLAN said the process was beautiful from its simplicity, and as there were many interesting scenes around them both amateur and professional photographers would do well to have them taken—partly for their own merit and usefulness, and also for the purpose of being introduced as backgrounds to portraits of friends and customers, thereby adding another pleasing feature to their art, and proving a means of

increasing their trade. He thought Mr. Tilley's process very complete, and felt much indebted to that gentleman.

Mr. Stevenson said he had given some profitable attention to Mr. Tilley's process. He had been accustomed to work Ford Smith's process, and had succeeded with it; but he thanked Mr. Tilley, and thought his process was an improvement and would save labour.

Mr. White said the process was very excellent.

Mr. Urie thought it was really something new, and photographers ought to encourage it by taking licenses.

Mr. Robertson remarked that the first important fact seemed to be that the process would suit any kind of glass house, and backgrounds could be introduced suited to any style of lighting. Then, although there were various changes required during the taking of a portrait and introducing the background, these could all be made with great speed and correctness by a little practice. He (Mr. Robertson) had tried a picture with Mr. Tilley's arrangement, and succeeded the first plate. He thought photographers were under an obligation to Mr. Tilley for the process, and the Society was greatly indebted to him for coming voluntarily to exhibit and explain his process so fully.

After some questions had been put to Mr. Tilley, which were satisfactorily answered, a cordial vote of thanks was awarded to that gentleman.

The meeting was then adjourned.

Correspondence.

GELATINE EMULSIONS.

To the Editors.

Gentlemen,—Almost the same experiments recorded by Mr. Berkeley in the last two numbers of the Journal I had been also making on my own account. Having prepared some emulsion by the "Franklin" formula—with the exception that I added a few drops of essence of cloves before washing, as I usually do to all gelatine emulsions in consequence of the keeping qualities it confers—what was my surprise to find the emulsion immediately turn a dark grey colour, which subsequent washing and filtering did not remove, and plates prepared with it had a fogged appearance when developed.

Thinking that, perhaps, the free silver might have had something to do with it I prepared another emulsion by the same formula, this time, however, not adding the essence of cloves until after washing, but as soon as added the same result followed. I laid it aside also, and proceeded to make a third, but this time added none of the cloves, and it turned out all right. The emulsion was somewhat thicker than that I usually make (which contains twenty grains of silver to the ounce, converted with its equivalent of bromide of potassium); but after numerous trials I did not find the "Franklin" plates more sensitive than my own, and they nearly all fogged in the shadows if the development were at all pushed, and had the appearance when finished of not being fixed, as mentioned by Mr. Berkeley.

To the first two emulsions that had turned grey I added hydrochloric acid, drop by drop, until they turned white again, then added about five or six grains of silver per ounce, and again washed the emulsion, which was now very sensitive, more rapid than the "Franklin," and produced plates very full of detail but rather wanting in density; they were, however, easily intensified.

I cannot well see how an emulsion can contain free silver after being well washed or dialysed; for I have frequently found that plates prepared with an emulsion containing free silver before washing turned red on applying the developer, yet, after being washed, or the free silver converted with bromide, produced clear pictures.

On your recommendation of the carbonate of ammonia developer I at once procured an ounce of it, dissolved half in four ounces of cold water, and corked up the remainder in a glass bottle. I found it developed beautifully without any restraining bromide, not requiring a longer exposure than with the liquor ammonia; but the image had quite a different appearance to that I had been accustomed to, the lights being of a yellow colour, having all the appearance of a wet plate by reflected light, and a rich brownish-pink by transmitted light. The high lights were also quite opaque instead of transparent; those developed with liquor ammonia looked black when compared with them. The films developed with the carbonate washed off the glass much more readily than the others; in fact, they dissolved off in the hot water more like an undeveloped film. The four ounces of carbonate developer in two or three days being all used, I dissolved, as before, the remaining half-ounce which had been corked up; but on trying it I found it had almost completely lost its developing powers. I noticed before dissolving it that it had became rather crumbly. The fact that it will not keep and must be prepared fresh whenever required is a great drawback to its use. What is the best mode of keeping it? Will it retain its powers longer in solution than if kept in the dry state?

I then made up some of "Davanne's alkali," and on using, as recommended, the same quantity as of carbonate the image immediately flashed out full of detail, and the developer turned black at once, forming a sort of scum or crust over the film, which, however, easily washed off. I afterwards found that about twenty drops of it and half-a-grain of pyro. to two drachms of water were sufficient. It seems to produce detail well, but I was unable to get good density with it. The films developed with this alkali had all the same appearance as if developed with liquor ammonia.

Blistering of gelatine films is often caused by drying at too high a temperature. My drying-box has two shelves in it, with an inlet for air below and an outlet at top. A tin of hot water placed below the bottom heats all air entering the box; but, if the water be very hot, I often find that plates dried on the lower shelf will blister, while those dried on the upper and cooler one will be all right.

I tried to transfer these films by the means you mentioned in last week's Journal but failed, they cling so tenaciously to the glass. If a successful method could be found it would be a great convenience.—I am, yours, &c., L. S. D.

May 9, 1876.

CANON BEECHEY'S MODIFICATION OF THE COLLODIO-BROMIDE PROCESS.

To the Editors.

Gentlemen,—I have been from home a week, and resolved to take with me some plates which I have kept all through the winter in my ordinary working room, where there is a tap with water in daily use, so that it is not very dry. I wished to test these simple chloro-bromide plates as to their keeping properties. At the same time, wishing to be sure of my picture, I did allow fifteen seconds more than the thirty seconds I should have exposed had the plates been new. The result was an over-exposed picture. It was the gateway of Burleigh, and the stone is overdone and too dense. But the plates have all the same wet-plate character, and are clear, dense, and very blooming. I cannot, therefore, see any deterioration in these plates, though kept without much care during the four winter months. In a few days I hope to complete some exhaustive experiments as to backing and blurring.

In the meanwhile, let me say a word on "Franklin's" communication (which I read in your number for April 21st), on the development of gelatine plates by the strong pyro. and ammonia recipe. "Franklin" mentions that he saw in the Almanac my remarks on liquid ammonia as compared with carbonate, and seems greatly to confirm my view; but I hope he also noticed that the developer referred to in my article is stated to be Colonel Wortley's printed formula. I think we must all assign to the latter the credit of that very strong developer, which, in a properly and not over-exposed picture, brings out the detail and completes the density together by the first intent in a wonderful manner.

Let me, however, venture to add that there is a quality in these plates, and, I think, in "Franklin's" also, which, though requiring patience, is very valuable. "Franklin's" first-tried plate, I believe, would have come out if well washed and a little humoured; at least I find it so with my plates. They require well washing, then the developer poured on, and, after well running about, poured off into the measure. Then watch the plate! It is really beautiful to see it continue developing till almost dry. Every detail comes clear and clean. And then, once again, pour on the developer, and the density comes up as if by magic. To me this is a charming quality, because you can stop the development when you like by washing. I can safely assure my friends that no silver intensifying is necessary; indeed, nothing but patience on the first appearing, but no real loss of time on the whole.

One other word on liquid ammonia. I never have any *stains* from the use of carbonate of ammonia or the strongest pyro.; but with liquid ammonia the whole character of the plate is changed. Farewell to the wet-plate bloom! There is a tendency to a dark, dirty-looking negative; and if you attempt to force the plate, as I often do with carbonate, there is a point at which the whole picture disappears, literally as if *washed out*. If any amateurs will really give my plates a trial this summer, and develope them by Colonel Wortley's process—modified, of course, according to exposure, and using carbonate of ammonia only—I am persuaded they will bring home at least as many good negatives as by any much more elaborate and complicated formula.—I am, yours, &c., St. Vincent Beechey.

Hilgay Rectory, May 13, 1876.

EXTEMPORISING A FOCUSSING GLASS.

To the Editors.

Gentlemen,—In the Journal of the 11th February last a formula is recorded as a substitute, in the event of an accident, for the focussing glass of a camera.

It may be useful to some of your readers to know that I use ordinary negative varnish, the opacity of which, when allowed to dry cold on a glass plate, seems to me to present a focussing surface in no way inferior to that of ground glass. This obviates the trouble of preparing a pellicle, and a dry-plate worker would not be baffled for the want of water.—I am, yours, &c., Albert Jenkin.

Ibsley Parsonage, Ringwood, May 15, 1876.

MR. SLINGSBY'S PATENT.

To the EDITORS.

GENTLEMEN,—I presume you were once boys, and no doubt you remember that when a good-natured lad had any cake or apples to give away he resorted to the following:—"Billy, Billy, bust who cries fust!" (first).

Now I don't want to share any profit that may accrue to Mr. Slingsby by the sale of his patent; but I desire to record the fact that I first promulgated the idea of glass being placed at an angle which carried the rays of light passing through it in the direction of the angle at which the glass was placed. I had therefore my studio constructed on that principle, which I showed to one of your number at my place in Ball's Pond four or five years ago. The top could not be made on the slanting principle, owing to objections made by the District Surveyor, which, I have no doubt, others have experienced; but the principle was carried out in the side light. Trusting you will substantiate what I refer to—I am, yours, &c., JAMES SYRUS TULLEY.

May 12, 1876.

[We can certainly substantiate the foregoing; but studios with both slanting roofs and slanting sides have been in use long before the period when Mr. Tulley's studio was erected.—EDS.]

EXCHANGE COLUMN.

No charge is made for inserting these announcements; but in no case do we insert any article merely *offered for sale*, that being done at the small cost of one shilling in our advertising pages. This portion of our columns is devoted to exchanges only. It is imperative that the name of the person proposing the exchange be given (although not necessarily for publication, if a *nom de plume* be thought desirable), otherwise the notice will not appear.

The *Photographic News* for 1861 and 1871, two vols, neatly bound, and good as new, will be given in exchange for *Nature*, vol. x. or xi.—Address, S., Bedford-villa, Clifton, Bristol.

A central-fire double gun, twelve bore, good as new, cost £15, and a silver hunting watch, warranted, will be exchanged for lens and cameras, by Ross or Dallmeyer, and background.—Address, H. GEORGE, Bracknell, Berks.

A fine whole-plate lens, by Goddard, with rack-and-pinion adjustment, will be exchanged for a good *carte* lens by Grubb, Ross, or Dallmeyer. Also, a four-inch aneroid barometer will be exchanged for a pocket camera or large glass bath.—Address, D. BREARE, Moor-lane, Burley-in-Wharfedale.

ANSWERS TO CORRESPONDENTS.

☞ *Correspondents should never write on both sides of the paper.*

REGISTRATIONS.—In our next.

MARSHALL WANE.—Received. Thanks.

W. BROOKS.—Thanks for the sample of "collocine." We shall give it a careful trial in a variety of applications.

H. W. D.—We shall endeavour to repeat your experiment as closely as possible, and watch carefully the behaviour of the mixture.

S. E. P. would be glad to receive information, from some one possessing practical experience, respecting the sort of presses used for unmounted photographs.

T. PROTHEROE (Bristol).—Our correspondent will be glad to hear of any brother artist who intends visiting the Philadelphia Exhibition about the middle of next month.

⁂ Owing to pressure on our space this week we have been compelled to hold over till our next our leading article on *Recently Patented Inventions*, an interesting communication from Mr. H. B. Berkeley, and other important articles.

J. COX.—1. We shall be better enabled to aid you by advice when you send us a photograph of your studio taken from the background end with a wide-angle lens. Yours is a case in which it is exceedingly difficult to offer advice without being on the spot.

J. E. THORBURN.—1. A few drops of acetic acid per ounce of water will be sufficient.—2. Try Rouch and Co.—3. Thin sheet zinc or japanned tin will answer well.—4. The fact of the hydrochloric acid being of the colour indicated will not affect its excellence for making *aqua regia*.

X. Y. Z.—If present at the last meeting of the South London Photographic Society you will have been made aware that there is now no necessity for the publication of your letter, the subject of the library having at last received due attention, and a committee appointed to deliberate on the matter.

PANORAMIC.—The lenses made use of by Mr. J. R. Johnson in his pantascopic cameras were Grubb's aplanatic. But there is no doubt that any good landscape lens will answer exceedingly well. Great care must be taken in the selection of a lens of the correct focus, or sharpness will be impossible.

ERRATA.—In Mr. Burrow's paper on *Bath* versus *Emulsion*, published in our last number, page 223, right-hand column, line eleventh, for "water two ounces" *read* "water *twenty* ounces;" and in the following page, left-hand column, line 12, instead of "more of the *water* in summer" *read* "more of the *acid* in summer."

T. L.—1. Tracing-paper has a slightly yellow tint, which is objectionable. It will be much better to dab the glass over with a mixture of finely-ground starch in cold water. This will serve to diffuse the light, and answer all the purposes of ground glass.—2. An English half-plate or French whole-plate lens will answer the purpose intended.

ARCHD. ROBERTSON.—The subject of your letter shall receive careful consideration; but at first sight, however, we fear that to compile such a ready-reference index as you suggest would necessitate the constant labour of more than a month. Of the great value of such a work, when completed, no one could entertain any doubt. It is a subject deserving of consideration.

J. R. POCKLINGTON.—Our correspondent attests the good keeping qualities of uranium plates, some that he obtained in 1871 having remained quite good up to the present time, in proof of which he encloses an excellent *carte* view of trees recently taken. We are always much pleased to hear of the good keeping properties of dry plates, more especially when, as in the present instance, no special means, or even ordinary care, have been taken to ensure their preservation.

A. W. E.—It is evident that the preparations you use are at fault in some way or other. We have never seen a negative that failed to become more intense when treated, after fixing, with an acid pyro. solution to which nitrate of silver had been added. Try the following:—After fixing, wash, then apply a *very weak* aqueous solution of iodine and again wash, and finally apply the pyrogallic acid and silver solution. It is better that this be done before allowing the plate to become dry after fixing. If the picture still refuse to intensify you must then have recourse to bichloride of mercury, followed by treatment with diluted sulphide of ammonium.

D. BREARE.—1. For phototypic processes any good kind of gelatine will answer, provided that it is clarified by means of albumen.—2. Two thicknesses of cambric form a good material through which to filter the gelatine. —3. If you possess vol. xix. of this Journal you will find in it an announcement of the lapsing of the patent.—4. The best proportions are those which just fall short of the bichromate crystallising.—5. Bichromated gelatine will keep good for a considerable period, if great care be taken to keep the bottle well closed and securely packed away.—6. Chrome alum will render a gelatine film insoluble.—7. Good results can be obtained from negatives taken from nature; but exceptional skill must be possessed by the operator.—8. No.

TAKING CHILDREN'S PORTRAITS.—"LYDIA."—Various devices have been resorted to in order to secure great rapidity of exposure without attracting the attention of the sitter. The conditions under which success in taking so-called instantaneous portraits of children are—first, the ability to expose the plate without the sitter being aware of the fact; secondly, the placing of the exposing shutter in such a way as to allow the *full* power of the lens to be brought to bear upon every portion of the plate during the time such portion is being exposed; and, thirdly, that the exposure be effected without producing any jar or vibration of the camera. To these conditions we may add, further, that the photographer shall have it in his power to prolong the exposure for an indefinite period. These embrace everything that theory can demand; it remains to be seen how they can be carried out in practice. To expose a plate without the sitter being aware of it, a solid frame of wood may be placed as closely in front of the plate as can conveniently be done. In this frame there must be an aperture the size of the picture (*carte* or cabinet) to be taken; and this aperture must be covered by a light wooden shutter sliding easily up and down between guides. It is kept *up* by the tension of two thin india-rubber rings, one at each of the upper corners, and it can be pulled *down* by means of a piece of string pendent from its bottom, and which is brought out under the camera. To expose the plate, pull the string; to prolong the exposure, retain the end of the string between the finger and thumb; to terminate the exposure, let go the hold upon it, when the elastic force of the india-rubber rings will immediately assert itself. By this simple contrivance—for a knowledge of which we are indebted to Mr. Faulkner—"instantaneous" exposures may be most successfully given. Another excellent method is to have a hinged flap in front of the plate, acted on by a knob or button projecting outside the camera.

METEOROLOGICAL REPORT,

For the Week ending May 17, 1876.

Observations taken at 406, Strand, by J. H. STEWARD, Optician.

THESE OBSERVATIONS ARE TAKEN AT 8 A.M.

May.	Bar.	Wind.	Wet Bulb.	Dry Bulb.	Max. Tem.	Min. Tem.	Remarks
11	30·18	E	46	52	63	42	Hazy
12	30·26	E	42	47	56	41	Dull
13	30·26	E	42	47	50	38	Cloudy
15	30·07	E	45	48	60	44	Dull
16	30·17	E	45	49	58	41	Dull
17	30·20	E	47	52	—	41	Cloudy

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THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 838. Vol. XXIII.—MAY 26, 1876.

ON CARBON TRANSPARENCIES.

The remarks in our leading article in the number for May 12 were very *apropos* in connection with a subject under consideration at a meeting of the South London Photographic Society, held at the very time of our going to press. The paper by Mr. W. T. Wilkinson, *On the Difference between Carbon and Collodion Transparencies for Enlargements,* gave rise to a very interesting discussion, the general feeling of the meeting being in favour of the suitability of carbon for the purpose in view, though it was on all hands admitted that by wet collodion or dry plates very beautiful results could be uniformly obtained. Much was said about professional secrets in the possession of the Autotype Company, with regard to which it is palpable that the Company are perfectly justified in keeping to themselves any little manipulatory details which years of practice may have revealed to them.

The subject is one of very great practical importance to photographers, and we need no apology for so soon again bringing it before our readers, the more especially as some additional experiments recently undertaken by us confirm the opinion expressed by several professional friends that the veil of any secret of importance existing in the working of the process was drawn aside in these pages nearly twelve months ago.

We have on view at our office a transparency, and a print from the enlarged negative obtained from it, showing the good results which, even from indifferent negatives, the method is capable of giving. A print from the original small negative does not possess any more artistic quality than the enlargement of about six diameters, while the sharpness is all that could be desired.

One point of the discussion deserves a little more than mere passing mention, and that is the relative certainty and evenness of results of two of the processes which were placed in friendly rivalry on the evening above mentioned. It must be borne in mind that in the large majority of studios the operation of enlarging, though an important branch perchance, is yet only of comparatively occasional performance, hence a natural predilection in favour of everyday materials must exist. The certainty of wet collodion is proverbial; and it is a matter of common knowledge that at any time one can produce results exactly identical with those taken a year or two before by the materials in daily use.

Now with carbon we confidently assert that such is not the case; the heat of the atmosphere, its hygrometric state, and a multitude of minor causes so influence the tissue, its solubility, and its rapidity, that it is not possible, till a batch of it has been sampled and tentatively worked, to know exactly the class of results that will be obtained from it. Yet it will be found that no practical inconvenience will be brought about by this uncertainty beyond a slight loss of time, for a very considerable latitude of exposure is permissible in producing carbon transparencies. One other objection must not be lost sight of in weighing the comparative merits of collodion *versus* carbon: it is the time required to elapse before a tissue transparency can be obtained after the operator has received his instructions. In silver work a good transparency can be had in any weather within ten minutes of the negative being put into his hands; in carbon—always presuming an average establishment where it is not in daily use and where enlargements are only occasional—the tissue has to be sensitised and well dried, an operation which would require some hours, and it has then to be printed, entailing further loss of time. Looking at the matter from a manufacturer's point of view these latter objections would have no weight; but we write not only for the few but the many, and for the many single workers to whose efforts and their publication photography owes more than to the few large establishments of one kind or another which, naturally, are chary of publishing their "trade secrets."

It is practically found in the studios spoken of, where carbon is only of occasional use, that the best plan is to put up the tissue in the evening in a suitable place, properly free from actinic light. A half-dark place, such as would suit for drying albumenised paper in (which is often sensitised in a room adjacent to a well-lighted working room, with no special precautions taken as to keeping the door closed), would not answer at all for carbon tissue, as it is so much more sensitive. The drying is a little troublesome, for the room must not be too cold nor yet too hot, and a damp atmosphere, above all, should be avoided. An airy place in a room of average temperature will answer well enough.

Dr. Van Monckhoven, in his new work *On Carbon Printing,* makes the suggestion—a very good one, it appears to us—that it should be placed to dry near the ceiling, on account of the warm currents which are usually formed there. These easily-carried-out precautions are all that are necessary, and could not be more pithily expressed than by the above-named writer, who says in his preface—"*Le tout c'est d'éviter le froid, le chaud, et l'humidité.*

We do not wish it to be understood that there is any special difficulty in working the carbon process for transparencies—that is, with the aid of the now well-known plan of preparing the glass which we have alluded to; for our well-considered opinion as to the enlargment of negatives—even not losing sight of the fact that a little difficulty must be experienced in mastering the manipulative details of any new process, especially one entirely out of the usual groove—is, that every one should give the carbon transparency method a full and fair trial. If he get over the very easily-surmounted first difficulties he is not likely to use any other afterwards. There is one special advantage in it over camera-produced transparencies, and that is the avoidance in the negative of the familiar light-coloured band round the edges of objects, and of that peculiar effect—a want of crisp yet modelled contrast—which always betrays an enlargement made entirely through the agency of the camera.

The method of preparing the glass which we published on August 6, 1875, we now reproduce in the writer's (Mr. G. Watmough Webster's) own words, premising that it has been found uniformly sufficient and successful in the hands of those who have put it into practice, and, we are given to understand, was "rediscovered," in the usual manner, half-a-year afterwards:—

"*Preparation of the Glass.*—This is in my experience a *sine quâ non;* for if plain glass be used it is next to impossible to get the film to adhere during the whole of the development, and yet, to the best of my belief, the method, or the necessity for it, has never been made public before. The process simply consists in coating the plate with

gelatine rendered insoluble by chrome alum; it is more quickly done by immersing the whole plate in the solution. A number can be prepared at once, and, when quite dry, stored away for future use. The solution is made by dissolving by hot water sufficient gelatine to give a perceptible body to the water, and then, while hot, adding a few grains (about one-fiftieth of the weight of the gelatine used) of chrome alum. Gelatine varies so much in substance that it is difficult to give exact proportions, but from a quarter to half-an-ounce to the pint may be used. Too much gelatine will do no harm; too little would not answer the required purpose.

"The difference between plain and prepared glass in working is most striking; with the former blisters are sure to occur, which, before the end of the developing, break and tear away. The film washes off at the edges, and there will generally be a few inches only of picture left at the end of the development. With the prepared glass the film is as adherent at the end as at the beginning of the process if the making of a 'safe-edge' (as the tissue-paper on the negative is called) have not been neglected."

We are making further experiments with the various tissues, which promise to be sufficiently interesting to warrant our return to the subject on a future occasion.

THE SCIENTIFIC EXHIBITION.

[Second Notice.]

It appears that the "nitrotype" process, with specimens of which we credited Messrs. Edwards and Wright last week, should have been more correctly designated the "heliotype" process. We quoted, however, from the catalogue, the first edition of which then was, as it now is, on the table before us, and which, we have been assured, contains some other errors—especially errors of omission. Such mistakes are—and, doubtless, correctly enough—accounted for by the dilatoriness of exhibitors in forwarding their exhibits in time. In subsequent editions everything will most likely be correctly entered.

In our previous notice we mentioned the name of M. Fizeau in connection with the introduction of hyposulphite of gold as a fixing agent for daguerreotypes. For the benefit of those whose acquaintance with photography does not date twenty years back, we may explain that when a daguerreotype picture has been developed by exposure for one or two minutes to the fumes emanating from slightly-heated mercury, the image is composed of a kind of metallic dust, which adheres so feebly to the plate as to be capable of entire removal by the slightest friction with a soft wash-leather. M. Fizeau made a most remarkable discovery in connection with this, namely, that by pouring upon the surface of the picture a solution of hyposulphite of gold, and holding it level over the flame of a spirit lamp until it became heated, a threefold change took place—the whites became much whiter and stronger, the blacks became much darker, and, finally, the loose particles of dust of which the image had been composed became agglomerated and firmly attached to the silver plate. This operation was known by the terms "gilding" and "fixing," which were both applied to the operation here described. In the present collection is a proof, by the same experimentalist, which has been obtained from an engraved plate; for, having mastered the fixing of the daguerreotype, M. Fizeau devoted much attention to the engraving, by chemical means, of this description of photograph. This print possesses much interest as being one of the first photo-engravings ever made. It was executed in 1843.

There is a fine and very large example of photo-engraving by Chas. Negré, bearing the date of 1856. It measures about two feet by eighteen inches, and it is to be regretted that no information is afforded concerning the mode of its production.

The specimens of Poitevin's early work which have been contributed will not fail to receive attention. These are carbon prints produced by the agency of gelatine and bichromate of potash, and of perchloride of iron and tartaric acid. They were produced twenty-one years ago.

A few specimens, by Niepce de St. Victor, attest the capabilities, in the hands of that gentleman, of the salts of iron and uranium. Several prints from waxed-paper negatives by Le Gray also add to the value of this historical collection; while several stereoscopic portraits executed by Daguerre, and exhibited by Fizeau, must meet with warm appreciation.

The Autotype Company challenge the criticism of those who imagine that they use pigments or materials in their tissue of an evanescent character by exhibiting a collection of the colours they employ. These comprise, among others, vegetable black, Paris black, indigo, brown and purple madder, Indian red, raw and burnt sienna, vermilion, lac de vin, and Vandyke brown. All these certainly bear a high reputation for permanence. Among the other exhibits of this Company we observe a series of actinometers by Johnson, Spencer, Burton, and Lambert. We need not here pause to describe them, as more or less detailed accounts of these instruments have appeared in this Journal—some only a short time since; for example, the one we consider as probably the best of the series—that by Mr. Burton—formed the subject of a full descriptive and illustrated article at page 302 of our last volume, to which we refer those of our readers who take an interest in the matter. The Autotype Company also display "tinting-frames" for Lambertype, various kinds of gelatine employed by them in their operations, and materials illustrative of their process of collotype.

Captain Abney exhibits a photo-relief plate for surface-printing, and also a proof from the same. It appears to be composed of stereo.-metal or zinc; but no information concerning its production can be gleaned from an inspection of it, being in this respect not unlike the Dallastype, of which process there are numerous illustrations in its vicinity.

The Woodbury Permanent Photographic Printing Company contribute a frame containing a negative, a gelatine relief from that negative, a metallic plate obtained from that relief, and a print obtained from the plate. This we conceive to be an excellent method of illustrating the ingenious invention of Mr. Woodbury; but it would be still better understood by non-photographic visitors if a short statement of the nature and peculiarities of the process, printed in simple and non-technical language, were attached to the frame of specimens. Indeed, putting photography aside for the nonce, it appears to have been taken for granted by the directors of the whole Exhibition that none but technical experts would ever pay it a visit; for no members of the general public who pass through this collection will emerge from the building very much wiser than when they entered it. We retract nothing of what we said in a previous article concerning the educational value of the various exhibits; but, in the main, their value will be confined to technologists, or, to speak more particularly, to those who enjoy an intimate acquaintance with the articles which the public are requested "not to touch," and with those which are securely locked up in glass-cases. To return, however, to the Woodbury Company: in addition to the negative, relief, mould, and print referred to, they exhibit a number of very fine transparencies of dimensions suitable for the magic lantern, the subjects being interesting and the tone of a most attractive brown. While speaking of transparencies we may observe that Colonel Stuart Wortley exhibits eight fine examples of this class of photograph, which are arranged round the top of the show-case containing the lenses to which we alluded in our last number. The subjects are principally marine views, showing instantaneous exposures.

Those who desire to see what can be effected by way of enlargements should examine two ten-inch transparencies exhibited by Professor Piazzi Smyth, Astronomer-Royal for Scotland. We direct attention to three points in connection with these exhibits:—First, the pictures are ten inches in dimensions; secondly, they are sufficiently sharp to satisfy every requirement; and, thirdly, the original negatives from which they have been produced are only one inch in size. No further comment is required for the thoughtful observer. The more cursory reader may be reminded that this means that a degree of enlargement of ten diameters (or one hundred times superficies) has been obtained. The picture, *Niche in the Queen's Chamber* (Great Pyramid) should be carefully studied, and then let those who will say that a method of photographing which can produce such results—the negative having been taken by magnesium light—is not deserving of our highest consideration. The companion picture, *Ali Dobre*—in which an Arab is represented seated upon a rock contiguous to the Great Pyramid—is also of an equally instructive character. There is also exhibited a microscopic slide box containing a number of the original nega-

tives taken (in 1865) by Professor Smyth; and, further, the bath which fulfils the double function of sensitising bath and dark slide of the unique arrangement by which these famous and historical views of the pyramids were obtained. We here remind the older readers of this Journal that in 1865 we published full details of the apparatus employed by Professor Smyth when taking his Egyptian photographs.

At this point we find that we cannot complete our notice of the photographic exhibits in the Exhibition in our present number; hence we must revert to the subject next week.

ON FINENESS OF DEPOSIT AS AN ELEMENT OF SENSITIVENESS.

The suggestion recently put forward by Mr. M. Carey Lea in explanation of the difference in rapidity between gelatine and collodion emulsions opens up a wide field of research for those amongst our dry-plate experimentalists who are engaged in the endeavour to improve the sensitiveness of existing dry processes, in which direction the efforts of most photographers at the present day appear to be turned. That a marked difference is noticeable in the results obtained upon films of varying fineness is indisputable; but the questions to be solved are, first, whether that effect is attributable to an increase of impressibility, and, if so, whether it is capable of extension to such a degree as to render it of practical value in diminishing the exposure of the plate in the camera. With the object of testing this point we have, since the publication of Mr. Lea's first communication upon the subject, made a few rough experiments in that direction, and though they are as yet far from completed we propose to give our readers the benefit of them in order that others may be induced to venture in a similar direction.

It should be borne in mind that sensitiveness is but a relative term as applied to any particular form of plate—that is to say, a film prepared according to a certain formula may, as compared with another film of different preparation, possess great sensitiveness to one class of rays, as the more refrangible; while, on the other hand, plate number two may probably be more easily impressed, in comparison, by the least refrangible. The well-lighted portions of a landscape and the weaker radiation of the shadows are not rendered with equal harmony by different processes, so that it becomes necessary, in considering this subject, to note the varying conditions as to light and colour under which different results are obtained. It is equally important to distinguish carefully between rapidity and mere density or vigour—a point upon which too many, we are afraid, are apt to base incorrect conclusions. A vigorous development of the high lights of a picture after a short exposure is too often mistaken for rapidity, when, perhaps, a strict examination of the details in the feebly-lighted shadows will reveal an amount of under-exposure which is to some extent masked by the deceptive vigour of the better-illuminated portions. Without, as we have said, the exercise of sound judgment in such matters no reliance whatever can be placed upon the results of otherwise carefully-conducted experiments.

It will be found, as a rule, that rapidity and density, unless special precautions be taken to produce the desired result, are not found to be co-existent in the same film, but that, to a certain extent, a sort of rule of compensation obtains, which requires that any gain in either direction be counterbalanced more or less in the opposite; hence we must consider that process the most rapid which combines the greatest degree of sensitiveness with a due amount of useful density. It is of little use reducing the exposure of a plate to the fractional part of a second, though the whole of the details may be depicted, if the image be so weak as to possess no printing power; while for landscape work and portraiture, at least, it is equally useless to court density at the expense of rapidity, though the latter is, we think, preferable to the former. It is possible to make a sample of pyroxyline which gives films possessing in the highest degree the quality of sensitiveness but wholly incapable of intensification; while it is quite as easy to produce identically opposite results. It is not, probably, easy to account for this diversity of behaviour, but it is, perhaps, not too much to assume that it arises from the action which the collodion exerts upon the decomposition of the silver salts. This action may take place in a twofold manner—first, as it affects the formation of the sensitive layer; and, second, as it modifies the action of the developer thereon.

Mr. Lea has spoken, in the course of his recent communications, of the retarding action of the viscid element in the collodion upon the combination of the soluble haloids with the silver nitrate. The retarding effect would conduce primarily to the formation of the haloid silver salt in a state of more minute division than would occur if the vehicle were of a less viscous nature—a result which, it might be expected, would tend to greater sensitiveness. But in proportion as the viscidity or "horny" character of the pyroxyline increases so does its property of impermeability to water or aqueous solutions; and here is presented a counterbalancing power which weakens the action of the developer by shutting up the atoms of the sensitive compound in a more or less impervious film, and destroys any advantage accruing from the first-named source. This is borne out by the behaviour of horny samples of collodion, which, in addition to being inferior in point of sensitiveness to the more porous films, are incapable of acquiring density. By comparing the individual properties of gelatine and collodion in this respect we are able to deduce an argument in favour of Mr. Lea's theory. Owing to the great restraining power of that substance upon chemical action the formation of the silver haloid in a gelatine emulsion takes place very slowly, and the deposit is remarkable for its fineness. The full benefit of such effect is thus obtained, while, at the same time, the film of gelatine, instead of repelling the developer, as is the case with collodion, actually absorbs it; and, in place of neutralising any beneficial action, in all probability augments it by bringing the developer into more intimate contact with the impressed particles of silver.

Many instances might be brought forward in support of this theory, but we shall only here have space to glance at one. Those of our readers who have had experience with Major Russell's tannin process in its early days, more especially the rapid form in which a simply bromised collodion was employed, will have remarked the extreme thinness and transparency of the dried film obtained—so thin, frequently, as to hold out but little hope of producing vigorous results; yet those thin transparent films were found to be not only the most sensitive, but also to intensify with the greatest ease. Dr. Hill Norris's rapid plates were also noticeable on account of their transparency, and that gentleman we believe to have stated his opinion years ago that such films were the most sensitive; certain it is that many photographers, without ever having attempted to explain the reason, have held the same opinion. Others at the present day prefer a rich creamy film as being the most sensitive, but we are inclined to think their conclusions erroneous. A thick film may with a given exposure produce an image of fair density with but little trouble, owing simply to the greater thickness of material upon which there is to work; but the weaker details in such thick films are not found to continue acquiring density under the action of the developer, as is found to be the case with thin ones. A given point is reached and then the developing action fails. The *rationale* of this peculiar action of thin films is easy of explanation. From their transparency the light passes through and acts upon the whole thickness of the sensitive matter, which, owing to its fine state of division, presents a greater surface, so to say, to the action of the developer, just as silver which has undergone the process of granulation is more easily acted upon by nitric acid than if submitted to it in the form of an ingot. We thus have the action of the light facilitated, while, at the same time, the latent image is acted upon by the developer under more favourable conditions than if it were composed of coarser particles.

Turning to the means at our disposal for increasing the fineness of the deposited silver haloid, we may, firstly, increase the viscidity of the vehicle in which it is to be suspended, and, secondly, we may bring together the combining salts in a state of greater dilution, as it is well known that the precipitates from very dilute solutions are much finer than when more concentrated solutions are employed. It is probable also that the addition of certain substances to the collodion would tend to retard combination and produce a fine deposit, but we have not yet tried in that direction, as the introduc-

tion of foreign substances, in addition to being a complication, might lead to wrong conclusions. With regard to the first-mentioned plan, as we have previously shown, to add to the viscidity of the collodion by increasing the "horny" character of the pyroxyline is worse than useless, the only means, therefore, at our disposal is to increase the *proportion* of cotton, taking care that it be of a suitable description. In following out the second plan we adopted the principle of successive additions of soluble bromide and of silver, allowing a sufficient time to elapse after each sensitising for the whole of the silver to become converted. By this means we were able to produce an emulsion of full strength, which at no period of its preparation held more than two grains per ounce of the soluble salts.

In the first series of our experiments we prepared three different emulsions, each differing in the relative proportions of pyroxyline and silver bromide, but otherwise identical. The first contained four grains of pyroxyline and twelve grains of silver nitrate to each ounce of solvents; the second, eight grains of pyroxyline and twelve grains of silver; while the third contained eight grains of pyroxyline and eighteen of silver, each being bromised in proportion to the quantity of silver nitrate employed. The results were, as we had anticipated, different in each case. No. 1 gave a dense, creamy emulsion in about three hours, No. 3 coming next in about eight hours, while No. 2 was not fully sensitised for slightly over twelve hours. As regards the appearance of the different films, making due allowance for the varying proportions of pyroxyline and bromide of silver they contained, No. 2 gave a clear, transparent film of great beauty, perfectly homogeneous and rather dense. When washed and dried it had by reflected light a smooth and polished appearance, and showed no tendency to structural markings. No. 3 came next, being similar in character to the previous one, though, of course, proportionately denser; when dried it presented a less polished appearance by reflected light, but scarcely sufficient to be noticeable. No. 1 presented a striking contrast to both; in spite of its thinness as compared with the others it was less transparent—that is to say, it lacked their clear, homogeneous appearance, and had a strong tendency to granularity when examined with a magnifier, while its dried surface had a dusty look frequently noticeable in emulsion plates prepared from acidified collodion.

Plates prepared from the three emulsions were treated in identically the same manner, and exposed for the same time. No. 3 was slightly denser than No. 2 and developed more rapidly, but did not exhibit the same facility for intensification as the latter, which gave a better and more vigorous picture. No. 1 gave a tolerably fair result, but was flatter in appearance and difficult to intensify, while the image was granular and poor in colour as compared with the other two. Further trials failed to establish any practical difference in sensitiveness, though the variation in the appearance of the pictures was markedly in favour of Nos. 2 and 3, especially the former.

Another sample of plain collodion was made as follows:—

Ether	4 ounces.
Alcohol	2 ,,
Pyroxyline	48 grains.

To one half of this we added fifty grains of commercial bromide of cadmium, and sensitised in one operation with an equal quantity of silver nitrate. Twelve hours after sensitising a number of plates were prepared for comparison with others prepared from the remaining half of the collodion, which required a much longer time to emulsify. It was first partly bromised by the addition of eighty grains of cadmium bromide, and sensitised with the same quantity of silver, this process being repeated at intervals of about twelve hours until the same quantity of salt had been used as in the previous case. The appearance of the two emulsions gave no intimation of any variation in the method of preparation, nor were the dried films distinguishable beyond a slightly more transparent look scarcely perceptible in the films made from No. 2. The developed images, however, were widely different both in colour, density, and ease of development, No. 2 holding the advantage in each instance. We could detect no difference in sensitiveness, though with equal exposures No. 2 *appeared* to give more detail; but this was owing principally, if not entirely, to the feebler portions coming up stronger under the continued action of the developer.

In conclusion: though we are unable to say that we have established any advantage in point of rapidity, we feel convinced that the question of the nature of the deposit of silver haloid is one which operates powerfully in connection with the subsequent development; that, in fact, by taking advantage of it we may render the image more susceptible to the action of the developing solution in the more feebly-lighted portions, while intensification is rendered much easier and a more harmonious picture secured. We hope to have the experience of other experimentalists in this direction before long.

RECENTLY PATENTED INVENTIONS.

No. X.—AN AUTOMATIC OXYGEN AND HYDROGEN APPARATUS.

The patentee, Mr. William Birrell, must not be held responsible for the title we have here adopted as the heading to a description of his apparatus; for the specification is very comprehensive, and we shall not attempt to describe more of the invention than is strictly interesting to photographers.

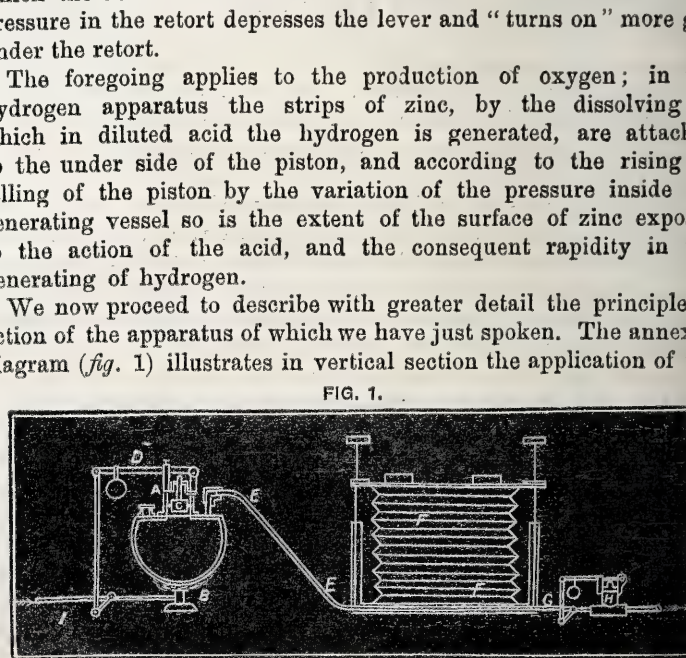
The invention relates to a new or improved arrangement for regulating the pressure of such gases as oxygen, hydrogen, and illuminating gas, as well as steam, the apparatus having also the effect of increasing or diminishing the production of the gases as required. The invention is likewise applicable to regulating the production of hydrocarbon oils, and of other oils, spirits, and liquids; but, as we have said, we shall confine ourselves to its application for the production of oxygen and hydrogen.

A general idea of the action of the apparatus may be obtained by supposing a piston placed in the mouth of a retort or in an opening formed at the upper side of a retort. This piston is attached to a lever, one end of which is centered on a bracket fixed to the side of the opening, or to the retort, a weight being placed on the opposite end of the lever, which is connected by a rod, cord, or chain to the handle of a regulating valve placed in the pipe through which is conducted the gas, spirit, or oil for heating the retort. The weight on the lever is so adjusted as to exercise a pressure equal to that desired to be maintained within the retort, so that, when the pressure in the retort exceeds or falls under the predetermined limit, such pressure, in the case of preponderance, acting on the under side of the piston raises the weighted end of the lever, acts upon the regulating valve, and thus decreases the supply of the oil or gas by which the retort is heated. In like manner a diminution of the pressure in the retort depresses the lever and "turns on" more gas under the retort.

The foregoing applies to the production of oxygen; in the hydrogen apparatus the strips of zinc, by the dissolving of which in diluted acid the hydrogen is generated, are attached to the under side of the piston, and according to the rising or falling of the piston by the variation of the pressure inside the generating vessel so is the extent of the surface of zinc exposed to the action of the acid, and the consequent rapidity in the generating of hydrogen.

We now proceed to describe with greater detail the principle of action of the apparatus of which we have just spoken. The annexed diagram (*fig.* 1) illustrates in vertical section the application of the

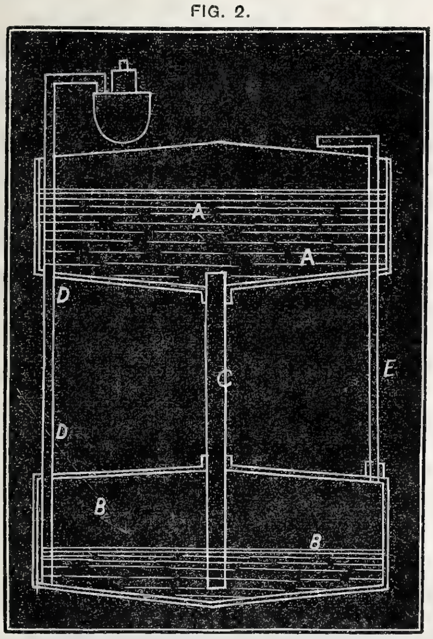
FIG. 1.



regulator in the production of oxygen, for which purpose a chamber,

A, is formed at the upper side of the caloric retort, in which the gas is generated by heat from a Bunsen's or other burner, or from a lamp at B. In the chamber A a piston or plunger C is placed, and which, accordingly as the pressure of gas within the retort rises or falls above or below the limit determined by the weight on the lever D, acts through the means hereinbefore described in such a manner as to diminish or increase the supply of gas, oil, spirit, or other source of heat to the burner or lamp at B, whereby in proportionate ratio the amount of oxygen gas generated, and, consequently, the pressure within the retort, is similarly diminished or increased. The gas exit pipe E from the retort communicates with a reservoir F, within which a store of oxygen gas at the pressure of that within the retort is maintained. In the exit pipe G, leading from the reservoir F, another regulator, shown at H, is placed, which increases or diminishes the supply of oxygen through the exit pipe G accordingly as an increased or diminished quantity of such gas is being used at the point of consumption, or it entirely cuts off such supply when the consumption of the gas is discontinued. The regulator H has also an effect upon the regulator A; for, when the regulator H cuts off the exit of gas from the apparatus, there being then no escape for the gas generated in the retort except into the reservoir F, immediately the said reservoir becomes filled or charged with gas at the fixed retort pressure the continued generation of oxygen raises the pressure above the fixed limit, and such excess acting on the regulator A shuts the stopcock in the pipe I, and thereby discontinues heat to the retort. Similarly the regulator H, by increasing or diminishing the passage of gas, has the effect through the regulator A of increasing or diminishing the rate of generation. By this means, then, both the production and the working pressure of the gas is regulated, as shown in the figure, a bellows reservoir F weighted on its upper side is employed, but in lieu thereof a tubular or hydraulic reservoir of the construction shown at *fig.* 2, may be employed instead of either of these

FIG. 2.

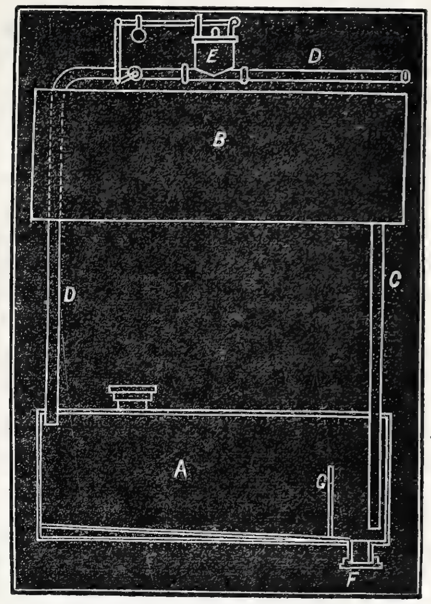


arrangements. This latter reservoir consists of an upper and lower chamber, A and B respectively, the chamber B being closed at its upper side, whilst that marked A is open thereat. Water introduced into the chamber A and flows therefrom through the pipe C into the chamber B, from whence it is again expelled upwards as the pressure of oxygen gas conducted from the retort into the chamber B by the pipe D increases. The gas exit pipe from the chamber B is marked E. To prevent collapse of the chamber B when no gas is being conducted therethrough, the retort is disconnected or other communication is made with the atmosphere.

Any other suitable arrangement of reservoir may be employed, and, instead of a caloric retort of the form shown at *fig.* 1 being used, a reversible retort with regulators both on its upper and under sides may be employed. The object of employing a reversible retort is that, as in making oxygen gas the chloride of potash liquefies and forms with the manganese a non-conducting cake of residue which prevents the escape upwards of the gas making constituents under it, by reversing the retort those consitituents are brought to the upper side, by which means all the material is utilised.

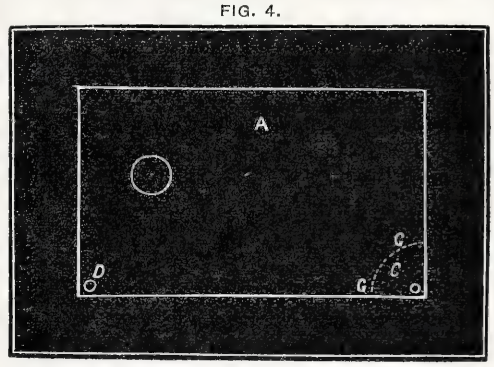
Figs. 3 and 4 illustrate the application of the invention to the production of hydrogen gas. The zinc or other material from which

FIG. 3.



the gas is to be liberated is placed in the lower close vessel A and the acid in the upper vessel B, which communicates with the vessel A by means of a pipe C. The gas generated is withdrawn from the apparatus through the pipe D, on which a bellows or other regulator constructed as hereinbefore set forth is placed at E or at other

FIG. 4.



convenient part of the pipe. If the gas generated by the action of the dilute acid upon the zinc or other material be not allowed by the regulator E to pass off as quickly as it is so generated, then the gas accumulating in the lower vessel A forces a portion of the dilute acid upwards through the pipe C; or if by means of the regulator the exit of gas through the pipe D is entirely cut off, the vessel A becoming totally filled with gas forces all the dilute acid upwards through the pipe C, by which means further generation of gas is prevented until the pipe D is again partially opened. To permit of all the acid being forced out the vessel A is formed with an inclined bottom, at the lower part of which the pipe C is situated. The dilute acid in the vessel B is replenished as required, and the waste is drawn off at the plug F, around which a fence or shield G is formed to prevent entrance of pieces of zinc into the plug hole. The height of the vessel B above the vessel A determines the fountain-head pressure, and the weight on regulator E the consuming pressure of the gas.

From the foregoing description can be realised a good idea of the lime-light apparatus for which Mr. Birrell has been granted a patent. The specification, as we have already observed, is very comprehensive, and contains many modifications and applications of the main idea here set forth; but we do not consider it necessary to enter into their details. The special claim made by Mr. Birrell is

"the new or improved arrangement or construction of apparatus constituting the regulator," with the various modifications as set forth in the drawings appended to his specification.

A DOUBLE dark slide which has been left by Mr. W. E. Debenham at our office, for examination, affords not only an excellent example of the modern utilisation of a piece of apparatus belonging to a former epoch in photography, but also gives a hint which, we think, may be utilised in the construction of slides at the present day. The slide in question is one of the "double" kind; but, unlike our modern slides, which are divided in two portions hinged together in the middle, this is solid. It was originally constructed for waxed-paper. It has a sliding, or exposing, shutter on each side, and a groove in the middle capable of receiving two plates of glass, which are inserted through a slit the entire length of the bottom. Originally, these plates were made to enclose two sheets of sensitive waxed-paper isolated from each other by a sheet of yellow paper interposed between them; and, after they were inserted in the slide, a narrow slip of wood formed a cover to the slit through which they were admitted, and prevented the admission of light. The modification required to adapt this slide to modern purposes is very simple:—Two sensitive collodion plates are made to take the place of the plain glass of the former period, and one good, stout sheet of opaque paper is placed between them. These sensitive plates are, of course, placed with their sensitive surfaces outside. When inserted through the slit and the narrow sliding lid closed the plates are ready for exposure. The "springiness" of the paper between them suffices to keep them firmly pressed against the respective faces of the groove in which they are contained; while, by a slight rounding of the sides of the slit through which they are inserted, the scratching of the surfaces of the plates is rendered impossible. To those who desire to construct double dark slides with a minimum of trouble and mechanical expenditure we commend the form which we have here described. It is very thin, convenient, and quite light-tight.

COLLOCINE.

MR. M. CAREY LEA, in the matter of "collocine," seems to have struck the right nail on the head. In my peregrinations amongst photographers I find it very much used and highly spoken of. But beautifully simple as is his method of preparation, it is surprising how much the various samples differ in appearance and properties. I have before me nearly a dozen samples forwarded by as many makers, and no two are exactly alike. Some are as dark and nearly as thick as treacle, while others are of a pale straw tint, and nearly as limpid as water. Probably the kind of glue or gelatine has much to do with the differences, but improper use of heat is likely to have had more. One correspondent writes that, according to Mr. Lea's directions, he has had the gelatine soaking in the dilute acid for five days, and it has not even yet dissolved. A hint to put the vessel in warm water had the desired effect, and he is now singing loudly the praises of collocine. In giving directions for the use of particular formulæ it should always be remembered that there are many worthy people whose knowledge of, and experience in, manipulations are of the most limited description, and therefore no necessary step, however trifling or apparently self-evident, should be omitted.

A convenient source of collocine I find in a common French glue or gelatine in thin sheets about six inches by three, and costing a shilling per pound. I adhere pretty closely to the proportions given by Mr. Lea, but for the sake of convenience manipulate larger quantities. Two fluid ounces of sulphuric acid are mixed with twenty-four ounces of water, and the mixture, along with one pound of gelatine, is placed in a porcelain basin, and allowed to soak for two hours. The basin is then placed in the mouth of a saucepan containing boiling water, the heat being kept up by a Bunsen burner, and the contents stirred until the gelatine becomes dissolved. Eight ounces of water are now added, and the whole transferred to a flask capable of containing at least sixty ounces. The contents of the flask are kept gently boiling for two hours, either over the naked flame of a Bunsen burner or, better still, as there is some liability to fracture, on a sand bath, the heat being so regulated as to keep the liquid just simmering.

During this part of the operation there is, especially towards the end, a tendency to *bumping*; and, although that is more unpleasant than dangerous, it is better to prevent it, which is readily done by the introduction of a few bits of broken glass.

At the end of the two hours three ounces of granulated zinc are added. This should be done somewhat cautiously, by turning the flask partly on its side, and letting the zinc slide gradually down the neck. If the zinc be in pretty large pieces it is apt, on coming in contact with the bottom, to break it if very thin, or, if very thick, to produce a crack, in consequence of the contraction caused by contact with the cold body. After the addition of the zinc the boiling is continued for two hours more or, perhaps, longer. In consequence of the viscid nature of the liquid the action of the acid on the zinc is extremely slow, as is evidenced by the fact that, even after four hours' boiling, the evolution of hydrogen can still be detected.

When the liquid is quite cold it is passed through a felt filter bag, or, if that should not be at hand, a piece of "cotton flannel" will do as well. It should be gathered up all round the edges, tied with a string, and suspended over a receiving vessel, and the collocine poured in. The first portion that comes through will be opaque; but it must be returned again and again till it passes quite clear, and then left to itself for probably a couple of hours, when it will all have passed through.

Collocine, as thus prepared, is a perfectly bright, limpid liquid of a pale amber colour, having a specific gravity of 1·159. It contains free sulphuric acid, has a faint but not unpleasant smell, and shows no tendency to deposit even after standing for many days.

Judging from my own experience, as well as from that of many who have given it a trial, I believe, from a photographic point of view, collocine possesses all the valuble properties that, and probably more than, Mr. Lea has claimed for it. I may add that, during the past fortnight, I have supplied samples of it to almost every photographer in Edinburgh, and that the testimony of nearly all those I have since seen is that, while the negatives are perfectly free from every trace of fog, the exposure required for the best results is less by at least a third than when the ordinary developer containing acetic acid is used.

Altogether the production of collocine is so simple that, with ordinary care, failure is out of the question; but as a very little goes a great way—one ounce being equal as a fog-restrainer to one hundred ounces of glacial acetic acid—it is probable that photographers generally will prefer to purchase it, as, supposing it cost a shilling per ounce, and glacial acetic acid two shillings per pound, its use will result in a saving of some twelve hundred per cent.

The difficulty, as Mr. Lea aptly remarks, is to get photographers to fully realise the fact that such a small quantity has so great a restraining power. It should be remembered that each drop of collocine is about equal to a hundred drops of glacial acetic acid, and must be used accordingly. The formula which I recommended to my Edinburgh friends, and which answers well, is as follows:—

Protosulphate of iron	400 grains.
Collocine	5 drops.
Alcohol	3 ounces.
Water	20 ounces.

JOHN NICOL, Ph.D.

ON THE MEASUREMENT OF THE ACTINIC VALUE OF SUNLIGHT.

[A communication to the Photographic Society of Great Britain.]

THE President has announced a paper from me tonight, and I must endeavour to fulfil my promise to him to the best of my ability, though what I am going to talk about I am afraid will not interest many nearly so much as it would if it were purely photographic in its purport.

Solar physics are each day growing more important, and we seem to be on the eve of the discovery of some great law which is to show the connection that exists between our luminary and the earth, in so far as regards climatic changes and meteorology generally. I am aware that the President would cut off from meteorology the registration of the diurnal actinic value of sunlight; but I personally cannot quite agree with his dictum, as I would include in that category any subject that will throw a light on those disturbances in nature that we are almost daily accustomed to witness. It can scarcely be classed under the head of photography, though it is the result of photographic action. If there be a doubt as to the head of science under which those records should be classed, I would say leave them unclassed till such a time as they show their own position, and then let that branch of science adopt them as its own.

Within the last year a remarkable paper, *On the Heat of Sunshine at London During the Twenty-Four Years* 1855 *to* 1874, *as Registered by Campbell's Method*, was read before the Royal Society by Professors Roscoe and Balfour Stewart. I need not enter into the details

of this imperfect method of registering the heat; suffice it to say that a hemispherical cavity was made in a block of wood, and a spherical lens was placed in this cavity in such a position that while its centre coincided with the centre of the cavity its chief focus was at some point of the hemispherical concave surface, the exact point being determined by the direction in which the rays struck the lens.

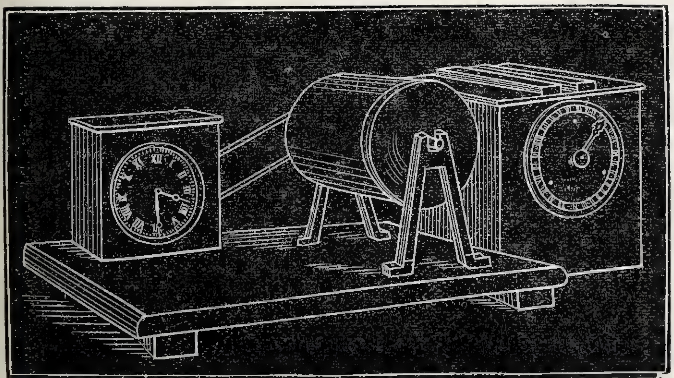
When the sun shone a portion of the wood was carbonised; and as the sun changes its position from hour to hour and day to day different portions of the wood were acted upon each hour.

Each block was placed *in situ* for six months, and then changed. The value of burnt-out wood was determined by the professors by filling up the hollows with a mixture of bees' wax and olive oil, and weighing the blocks before and after the operation. By this means an approximate value of the sun's heat each half-year was obtained. After a careful digest of the values thus obtained it was shown that there is more solar heat in the years of maximum solar disturbances than in the minimum, which seems to accord with an observation by Dr. Warren De la Rue that the number of fine days in which solar pictures can be taken follows the same law. Thus every eleven years we may infer that there will be a maximum of solar heat in London above the years between them. This rough method of ascertaining the solar heat is now replaced by a more delicate and perfect method due to Balfour Stewart; and it is considered advisable that the registration of the total diurnal actinic force of the sun should also be undertaken, to ascertain if this coincides with the times of solar heat maxima and minima. From one point of view it might be considered that when there are most solar spots then there will be the least light, as the dark patches on the sun's surface should then cause a loss. Again: from another point of view, the presence of sun-spots may lead us to infer that there is more energy in the source of heat in the solar disc at those times, and, consequently, the diminished surface from which the most intense light proceeds is more than counterbalanced by the increased intensity of the light. The determination of this point must lead to a more accurate estimate of the force at work in the sun, and give a nearer approximation to the absolute heat of the sun. The last problem, I may state, seems to be in a fair way of solution by Lockyer; and all the observations obtained by Balfour Stewart's method for determining the solar heat and those for actinism will give certain data which will be of the highest importance in this investigation.

Professor Roscoe has introduced a very pretty instrument for the measurement of the chemical action of total daylight. It is described in a paper read February 5, 1874, before the Royal Society; and owing to his kindness I have had the instrument at work at Chatham during the last eight months. It is dependent on the exposure of a small disc of paper to sunlight. Each hour there are ten small discs exposed, during times varying from two to thirty-two seconds. Each disc is obtained by causing a strip of paper to move automatically before a circular aperture. Thus the paper moves a certain distance, then stops and receives the exposure, and then moves forward again.

At the end of the day one or more of these insolations is taken and compared with a graduated tint, such as I have here, and the value noted. The integral of the sunlight is thus obtained—though the process is slightly laborious, taking an hour for the reading, as each comparison is repeated three times, and in each hour two exposures are read; thus in ten hours' daylight sixty readings are necessary.

The small instrument I have here is not meant to supersede the above, but simply to enable those who cannot afford the more expensive instrument, and the time for reading it, to register the chemical value of total daylight in a simple manner.



Here we have a cylinder revolving on a central axis, covered by a box in which there is a narrow slit one-eighth of an inch in breadth; over this is a flat graduated glass obtained photographically. A pulley attached to the cylinder is connected by a band with the drum of an ordinary ten shilling French clock. The cylinder covered with sensitised paper revolves once every twenty-four hours. When placed in the daylight the photographic action takes place through the glass wedge, and according to the intensity so it blackens the paper longitudinally. The paper is prepared according to Roscoe's method described in the *Philosophical Transactions* for 1865, by which means a uniformly sensitive surface is obtained. Unfortunately the paper thus prepared is excessively liable to discolour when kept. As I have had no opportunity of getting a reading since last Thursday, I have brought two registrations on permanent sensitised paper, which were taken to try the instrument now before you. The effects of cloud are well visible, the different lights and shades showing whether the sun was obscured or not. The reading of the results is now to be described. In a yellow light the drum or cylinder is removed and placed in the supports of the whirling-apparatus, the band is placed over the little pulley, and by means of the large wheel the cylinder is made to rotate about thirty times a second. This rapid rate of revolution integrates the different tints and gives a mean tint. I have here four tints of known value, and these are compared in monochromatic light produced by the sodium flame with the graduated tint on the rotating cylinder. Where these correspond a reading along the supporting bar is taken, which shows to which portion of the graduated glass strip the mean value of the darkening action is equivalent. The four readings are noted, and the mean of these taken.

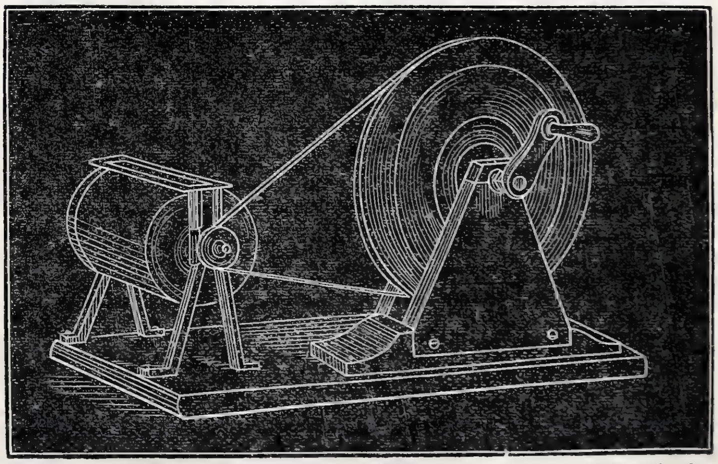
The reason why four tints are read is that twice or three times the intensity of sunlight admitted does not mean twice or three times the blackening of the paper, as I have shown in a paper in the *Philosophical Magazine* for 1874; but by distributing the error likely to arise on each side of a probable mean the resulting reading will be very nearly correct.

Now comes the question—How is the graduation of these comparison-strips effected? It is in this way:—A disc of wood is taken, and out of it is cut a certain portion or portions, so that if it be caused to revolve in contact with a sheet of sensitive paper the graduation proceeds in accordance with the time of exposure. Thus at a short distance from the centre the paper receives no exposure, whilst halfway between that and the outer portion of the revolving disc it receives half the exposure that the totally-exposed paper would receive, and so on. The proper portions of this graduated tint are taken and employed.

Another question that arises is—How can it be certain that the same standard is always maintained? This is easily effected by exposing a dry plate in the same manner and developing it and toning with platinum, and calling this the "standard" negative. Paper exposed under this can always be printed to the depth so that a line marked in the most opaque part of it is just visible.

Another method of attaining the same object is by exposing chloride of silver paper for an hour at a fixed distance from a standard argand burner, consuming a known quantity of gas of a certain candle power, or else by using a paraffine lamp with a flame of a certain height and breadth. Roscoe obtains his by mixing a certain proportion of zinc oxide with lampblack.

The standard is, at the best, empirical, however; and the most satisfactory way would be to have a graduated tint fixed with hypo-



sulphite of soda, which should only be used for comparisons of other tints to be employed in the readings. The tints I use are on the same standard as Roscoe's, and thus our readings are comparable with those taken at Kew and Manchester.

The original instrument I made myself. I obtained a tin cylinder made out of a biscuit box. Holes were pierced in the centre of the

lid and bottom, and a thick wire soldered in. Out of a couple of pieces of sheet iron grooves were cut for the axis, and a small pulley turned of the same size as the drum of the clock. The latter was placed in position, and a silk thread passed over it and over the pulley. A cardboard box was made to answer the purpose of the wooden box of this instrument, and the apparatus was complete. The exposure was made under glass (preferably a dome shade), which protected it from wet. Those who do not care for appearance can make one in a similar manner, and it will be effective, though the cost of that before you is small.

For the last five years I have obtained registrations of the action of sunlight by hand at different times of the day, but now I think that the records will be much more perfect; and I shall be delighted to hear that anyone else will take up similar observations in different parts of the globe, for I am confident that when the work of a few years is tabulated much light will be thrown upon solar physics by it.

W. de W. Abney, R.E., F.R.A.S., F.G.S.

NOTES FROM THE NORTH.

The Edinburgh Photographic Society is fairly in for an exhibition, and, as the Lords of the Treasury have in the most liberal spirit granted the use of the Royal Academy National Galleries for the purpose, it will be held under greater advantages, and should come off with more *eclat* than anything of the kind hitherto attempted in Edinburgh. If the magnificent suite of rooms of which the Galleries consist are to be filled—and the exhibition will hardly be thoroughly successful if they are not—the members had better "take time by the forelock" and let their intentions, expectations, and inducements be as widely known as possible, that photographers all over the world may have an opportunity of not only accepting the invitation to exhibit, but of getting up specimens of their best work specially for the purpose. In addition to the exhibition of photographs I understand it is contemplated to illustrate by specimens, step by step, the progress that has been made in several of the more important processes, and it is very desirable that all who are in possession of *matériel* of this nature should render such assistance as will make this department, both from a technical and historical point of view, most interesting and successful. It is intended also to make a special feature of apparatus, and probably, too, of chemicals; in which case I trust manufacturers of both will give photographers north of the Tweed an opportunity of examining, at their leisure, the highest class of articles that can be produced. As the exhibition will not open till about the middle of December, I may here throw out a hint to exhibitors at the grand show just opened in Philadelphia, that they might, without much trouble, have such exhibits as may be suitable sent on to Edinburgh at the close of that great world's fair. I do not know anything about the arrangements for the reception of exhibits, but, doubtless, the ordinary advertising mediums will soon tell us all about that.

Different people seem to have strangely different ideas of dignity. The observation made by Mr. W. T. Wilkinson, at a meeting of the South London Photographic Society, last week—to the effect that professional photographers are too dignified to "mess about with dry processes"—has caused no little amusement among both professionals and amateurs here. I have no doubt that Mr. Wilkinson is quite at home in the production of carbon transparencies, but fear he has yet much to learn about dry plates. If the Fates would only send him on a holiday ramble to Edinburgh, and let him join the Edinburgh Photographic Society on one of its outdoor meetings, I would furnish him with all the necessary appliances for wet collodion, and pit him against any one of a dozen of our average dry workers, in perfect confidence that either he would return to London a wiser man, or that we should discover that "dignity" meant something very different on opposite sides of the Tweed.

I am writing during "term" week—a period when a considerable number of the inhabitants of Edinburgh, as if with one consent but with very little mutual arrangement, go in pretty extensively in exchanging dwelling-houses and business premises, very much to the discomfort of all concerned; and, as photographers are not more exempt from this *penchant* for "flitting" than the rest of the community, there occur several cases which may merit a passing notice. "Flitting" means re-erecting, and, of course, improving studios; but as the alterations are not yet sufficiently advanced I must delay saying anything of their nature till my next batch of *Notes*.

John Nicol, Ph.D.

AN OXYGEN RETORT.

[A communication to the Manchester Photographic Society.]

I have to show you, tonight, some new machinery for obtaining oxygen by feeding the ordinary conical (or a special) retort with dry, powdered chlorate of potash and manganese, as the gas is wanted.

Before the apparatus was ready and tried I had made a drawing, and had also started to write out the usual "paper," as I expected all would be right, but I found afterwards I had been counting my chickens rather too soon. There not being time before the meeting to make the required alterations in order to remedy the defect, I have brought the machine as it is, and will set it to work presently. Not having an ordinary conical retort to operate upon I have provided a substitute. The body of the retort is a small cast-iron glue-kettle, seated in a cast-iron ring; this ring will be the top of a three-legged stool, sufficiently high to admit an aërated gas burner underneath for heating the bottom of the kettle. The mouth of the kettle is closed by a flat lid, fitted air-tight, provided with a central inlet for the chlorate, and a smaller outlet for the oxygen; this lid is held down by two bolts passing through lugs and the ring under the kettle, forming, as it were, a pair of clams. This arrangement does very well, and gives great facility for washing out, drying, and seeing the inside of the retort.

Above the lid of the retort is a horizontal cylinder three inches long and one inch and three-eighths bore, containing a brass screw one inch and a-quarter in diameter, half-inch pitch; one end of the cylinder is closed, the other has a flange, lid, and stuffing-box, through which the screw-shaft passes. Underneath the front end of the cylinder a conical branch connects to the lid of the retort. Above the closed back end there is an inlet branch connecting the cylinder to a hopper containing the dry powdered chlorate—the "hopper" being, in this case, a pint bitter-ale bottle, for the sake of its transparency. By rotating the screw the dry chlorate is drawn forwards and dropped into the retort. The action is quite satisfactory up to a certain point, as I shall show you, the delivery being limited only by the contents of the hopper.

The retort being now connected, and getting hot, on turning the screw I feed in some chlorate; oxygen begins to be liberated and bubbles through the water in the Woulfe's bottle on the table, as a matter of course. But an enemy is creeping up to stop this game. Direct experiment proves that the cylinder is too near the source of heat; the cylinder and screw get hot; the chlorate partly decomposes, fastens to the screw, chokes it, and prevents it from working properly.

The distance from the bottom of the retort to the centre of the screw-shaft is only four and three-quarter inches, while in a common conical one it would be about double this, so that there is a little hope left of a better result some day. Instead of a flat lid I ought to have a cone that will raise the screw shaft three inches or more higher.

The idea of using a glue-kettle as a retort is not a recent one, for I mentioned it to Mr. Winstanley when we had the phosphorus light on, one being used then as a boiler for the phosphorus.

Now all this has been done with a view of saving the making of the plugs, and I am reminded with a delightful (?) sensation that I have "jumped out of the frying-pan into the fire" by causing more work to be done amongst, probably, five or six hundred people in partial darkness than is required when using plugs. Whether this be so or not will depend upon the ability to keep the screw clean, which has yet to be accomplished; so there I must leave it for the present.

Believing that a really good cast-iron substitute may be made for the ordinary sheet-iron, copper, or mercury bottle retorts, I have made a drawing, full size, of a new kettle I have which holds two pounds seven ounces of water. Cast iron will last much longer than any of the others; the facility for cleaning out cannot be better. From the top of the cone to the bottom outside of the kettle is eight inches; from this a scale may be made for measuring the other parts.

M. Noton.

FOREIGN NOTES AND NEWS.

A "Wrinkle" for Carbon Retouchers.—New Microphotographic Map for the Télemeter.—Nothing but a Report.—German Photographic Annuals.—The Spectroscope in Post-Mortem Examinations.—Paris Photographic Exhibition.—Davanne's Modified Alkaline Developer.—Fulminate of Silver in the Bath.

Herr Norden communicates to the *Archiv* a "wrinkle" on the retouching of carbon prints with powdered colours before transfer.

He says the retouching will be greatly facilitated if, after the picture is developed and washed, it be coated with a mixture of one part of glycerine to twenty parts of water.

It is reported that during the siege of Paris M. Dagron micro-photographed no fewer than 3,000 letters (notes, not merely letters of the alphabet) upon a piece of paper half the size of a cigarette paper, and then enlarged them again by means of the télémêter. This powerful little instrument, which was described in these *Notes* some six months ago, is said to require no more light than that afforded by a cigar to illuminate and enlarge a microscopic map, so that it can be consulted in a few seconds. The télémêter, as already mentioned, is the joint invention of three gentlemen — MM. D'Allemagne, Triboulet, and Dagron—and the latter has prepared for it a reduced copy of the general map of France so small that it can be carried in a pocket-book with ease.

According to a widely-circulated rumour, taken up by the Austrian *Sonn-und-Montag's Zeitung*, amongst other papers, Herr Geschmeidler, of Vienna, an amateur photographer, has discovered how to take photographs in the natural colours. In consequence of many inquiries as to the reality of the discovery Herr Luckhardt and Dr. Székely set out on a voyage of discovery after the said Herr Geschmeidler and his wonderful invention. They were successful in their search, in so far as that they found the inventor; but, alas! the invention proved to be nothing more—nor did the inventor represent it to be more—than a mechanical process of colouring from the back photographs previously rendered transparent by being rubbed with some substance, such as dammar lac, wax, or paraffine. "There is nothing new under the sun, saith the preacher," and we are as far as ever from being able to take direct photographs in colours. Even in its shrunken form the "invention" has already been invented by Mannsfeld, Wunder, and who can tell how many more "inventors" since.

At the last meeting of the Vienna Photographic Society the president, Dr. Hornig, in speaking of photographic almanacs, thought that one cause why German publishers are not so enterprising in issuing those annuals as their French and English brethren is that in Germany the cost of such publications is not so far covered by the advertisements as in those other countries. Dr. Hornig, of course, knows his own countrymen best; but the present writer would think that a little more enterprise on the part of the publishers would pay, and that if the circulation were increased and the advertising charges fixed at moderate rates there would be no lack of advertisements. At least that is how things work in this country, for, of course, one prefers to send one's advertisements to the place where they will obtain the greatest publicity amongst the class of readers to whom they are addressed. It may be different in a country where readers depend mainly on the circulating and public libraries for their pabulum; but surely even there professional literature is an exception to the general rule, and is bought, not borrowed.

While dealing in suggestions we may mention that a contemporary suggests that the spectroscope might be of great use in detecting the presence of poisonous minerals and salts in *post-mortem* examinations. Quite recently it was used to decide certain disputed questions in relation to insectiverous plants. Freshly-killed flies soaked in citrate of lithium were placed on the leaves of one of these plants, and some time after the plant was reduced to ashes. On examination of the flame with the spectroscope the lines of citrate of lithium were detected.

The Photographic Exhibition was opened at Paris on the 2nd inst., in the *Palais d'Industrie*, and was a very great success. A large portion of the building is occupied by photographic apparatus and pictorial works. We understand that the production of mechanical prints will be practically demonstrated on Tuesdays and Fridays under the superintendence of M. Léon Vidal.

M. Davanne, speaking of the alkaline developer, has recently given to the Photographic Society of France an account of some experiments he had made with saccharated lime. M. Davanne finds that the use of this substance in the alkaline developing solutions can replace ammonia, carbonate of ammonia, and potash, or other alkaline reagents. Without affirming that the results were better, he had found them equally good, the use of the lime being attended with probably a little more rapidity. He recommends this solution because it is easy and certain. The following are the proportions:—

Ordinary water	100 cubic centimetres.
White sugar........................	10 „
Lime..................................	(an excess).
Bromide of potassium	1 gramme.

The lime is dissolved in the water, care being taken to add a much larger quantity then can be dissolved. The clear liquid is afterwards decanted. The following is the mode of procedure:—Wash the plate with water and pour the washings into a graduated glass, to every 100 cubic centimetres add five c. c. of saccharated lime, and pour this upon the plate. The greater the proportion of gallic or pyrogallic acid the preservative contains the more rapidly will the image become developed. It only suffices to add to this liquid two or three cubic centimetres of a solution of pyrogallic acid at ten per cent., which rapidly brings out the image. Although the liquid may blacken, the image will remain pure and free from fog.

On the subject of a recent communication to the South London Photographic Society Professor Stebbing writes:—"It is well known to those who occupy themselves with the manufacture of nitrate of silver that it is much better not to make this salt from an alloy of silver and copper, because the great heat required to decompose the copper salt often produces nitrite of silver. It is equally well known that when a great number of plates have been sensitised in the same bath after it has stood a short time, and especially when the temperature is low, thousands of crystals can be seen in the lower part of the bottle forming a sediment. Mr. Warnerke states that these crystals are a fulminate of silver. Now, as this is a very dangerous compound, it would be well for some experimental chemist to give the cause of the formation of this salt in the bath, and then to inform photographers how to get rid of it with ease. I have myself been greatly annoyed by the formation of these crystals in my bath, and as I purchased my nitrate at that time I attributed it to the manufacturer having allowed the nitrate of silver to remain too long in a state of fusion. I then determined to manufacture my own nitrate, which I did from pure chloride; but imagine my astonishment at finding the same crystals in my bath after a few weeks. My attention was then drawn to the article in the journal which stated it to be a fulminate. I think it my duty to bring this subject before the readers of The British Journal of Photography, as it may be the means of averting a danger—by telling photographers never to put a solution containing these crystals into an evaporating dish, or an explosion will inevitably take place if the crystals be a fulminate. The means I generally employ to get rid of them are as follow:—I have found the crystals to be soluble in an excess of nitrate; therefore, after having worked my bath, I add a few ounces of distilled water. This precipitates the excess of iodide and, at the same time, weakens the strength of the solution. I then allow it to remain all night near freezing point; the next morning a filter clarifies the solution, and it is ready for work as soon as the specific gravity is brought to the desired point by the addition of fresh nitrate. Now, if any operator know a more convenient and better means to get rid of these crystals, he would render service not only to myself, but to the photographic community in general."

Meetings of Societies.

MANCHESTER PHOTOGRAPHIC SOCIETY.

The last meeting before the holidays was held at the Memorial Hall, on Thursday evening, the 11th inst., — Mr. A. Brothers, F.R.A.S., Vice-President, in the chair.

After the routine business, the Chairman read the following resolutions of the Council:—"That a special outdoor meeting be held to commemorate the 21st year of the Society's existence, and that the trip be to Alderley."—"That the members assemble at the Queen's Hotel, Alderley, at six o'clock for tea."—"That the Secretary shall fix the day."

The Chairman then read the following letter from Mr. W. D. Sanderson:—

Manchester, May 8, 1876.

My Dear Sir,—I fully intended being at the meeting of the Society, on Thursday next, to make a communication to the members of the Society respecting a new method of preparing collodio-albumen plates—so much used, and with such great success, by the majority of the large number of members comprising our Society; but, having to leave home on Wednesday, I shall be prevented. However, I think the next best thing to do is to send to you the information I have to impart, especially as this is the last meeting before the vacation.

The only objection, I think, that can be raised against the collodio-albumen process is the long preparation of the plates; and, with a view to reduce this, three years ago I first prepared a few plates without a collodion bath. First of all I covered the plates with—

Albumen	1 part.
Water	30 parts.

When dry I poured on a bromo iodide emulsion, allowing it to set, then immersed it in a dish of water and washed well, and afterwards proceeded in the usual

way of preparing collodio-albumen plates so well known to the members of this Society. The baking before a fire or in an oven I entirely omit, for the simple reason that I find there is no difference in plates so treated and those dried spontaneously.

The emulsion I make by adding to one ounce of collodion (Huggon's) eight grains of nitrate of silver, first dissolved in a little alcohol; when ready I add it by degrees to the collodion, shaking well after each addition. I then allow it to rest a day or two, again shake before using, and finally shake well and filter through cotton-wool.

The negatives I have sent were prepared in this way, and I leave you to judge whether the matter is worth communicating to the members.—I remain, yours, sincerely, W. D. SANDERSON.

Chas. Adin, Esq.

The CHAIRMAN exhibited and described the simple but efficient appliances used by himself in taking photographs of the moon.

Mr. COOTE showed some negatives on plates prepared with the Liverpool emulsion. He stated that, although the plates had been kept five months, the negatives on them were perfectly clean and good. The exposure given was two and a-half to three minutes.

Mr. Noton exhibited some new machinery for producing oxygen, and read a paper on the subject. [See page 248.]

Mr. D. Young showed a large retort and gas jets capable of supplying sufficient oxygen for ten limes in work at one time.

Mr. LEVER claimed to have made a similar article fifteen years since.

Mr. Leigh showed a collodion filter in which fine sand, supported by a piece of muslin, was used to filter through.

Mr. Chapman sent one of Kennett's new camera-stands for exhibition.

Mr. McLeod, of Newark, presented four fine views of Lichfield Cathedral for the Society's portfolio.

The thanks of the meeting were accorded to all the gentlemen who had contributed to the evening's entertainment, and the meeting was then adjourned.

Correspondence.

MR. M. CAREY LEA'S NEW DEVELOPER.

To the EDITORS.

GENTLEMEN,—The new collo-developer, the details of which have been so generously given to us by Mr. M. Carey Lea, and which has also been prominently brought forward by Mr. Brooks, is, I think, worthy of more attention than it appears to have hitherto received.

I fully agree with Mr. Brooks as to the value of gelatine in the developer, the negatives produced by its aid having a much finer deposit than those developed without it; but I have always found that it has a retarding rather than an accelerating influence. This barrier to its general adoption has been, in my opinion, entirely removed in the method just published by Mr. Lea; and, although both Mr. York and Mr. Dunmore—for whose opinions upon photographic matters I entertain the highest respect—have spoken disparagingly of it, I believe it will yet be recognised as a most valuable introduction.

I have now used it exclusively for the last three weeks, with what success I leave you to judge from the few prints I herewith enclose.

It is only fair to state that my first attempts were anything but encouraging; but this arose from using the developer too new. From this I infer that *old* collo-developer, perhaps more than old wine, will make the heart of the photographer, at least, to rejoice and be exceeding glad. I would strongly urge my brother photographers to give this new developer a fair trial. I am glad to see that Mr. Brooks has forwarded you a sample to experiment with; I, for one, shall be glad to learn, through your pages, the results.

I hail with much pleasure the re-appearance of a former contributor to photographic literature in the person of Mr. A. H. Wall, who has been so long hiding his light under a bushel—at least so far as photography is concerned—and that the ray which appeared in your last week's issue may expand into a luminous and constant flame is the sincere wish of,—Yours, &c., W. COBB,

Instructor of Photography, Royal Military Academy, Woolwich.

May 23, 1876.

[The specimens enclosed by Mr. Cobb fully warrant him in expressing his high sense of the value of the developer by whose agency they were produced.—EDS.]

THE REJLANDER MEMORIAL FUND.

To the EDITORS.

GENTLEMEN,—Will you permit me to inform those who were so good as to subscribe to the *Rejlander Memorial Fund* that a meeting of the Executive Committee was held on the 18th instant, Sir Coutts Lindsay in the chair, for the purpose of winding-up affairs. It was then announced that the moneys received from all sources amounted to £270, and that all the creditors of the late Mr. Rejlander had been satisfied. £122 has been paid on account of debts, and £20 advanced to the widow, leaving a balance in hand of £128, which may be slightly increased by a few donations.

It was resolved that this balance should be handed over to a committee of four gentlemen, to be employed to the best advantage for Mrs. Rejlander, their names being Sir Coutts Lindsay, Mr. Valentine Blanchard, Mr. W. F. Mills, and—Yours, &c., H. BADEN PRITCHARD.

War Department, Woolwich, May 19, 1876.

THEORETICAL CONSIDERATIONS *RE* GELATINO-BROMIDE.

To the EDITORS.

GENTLEMEN,—When I wrote my last communication—which you have favoured with a prominent position in last week's Journal—I hinted at the possibility of your readers coming to the conclusion that there is more "wind than weight" in my communications. That there is plenty of the former commodity I am well aware; but I leave it to you and your readers to judge whether there be much of the latter. If the verdict be favourable I am amply compensated for my trouble; for, doubtless, there is "trouble," even though I don't "go in" for "acres" of it! But, at any rate, I am very glad to contribute anything that may conduce to interchange of opinion, especially as I am not the one who would profit the least by it.

If I have written a great deal lately I have also experimented much. This, combined with the *will*, should account for the "large letters" I have lately inflicted on your readers. While I am on this subject I would say that, though, doubtless, "brevity is the soul of wit," as I have not the necessary "wit" to command this "brevity" I must content myself with detailing my experiences in a roundabout way. It seems to me that many a communication has lost much of its value by being condensed to such an extent as to make it more like an abstract than "working directions." As it is, I find myself "in a position" to inflict yet another letter on your readers—that is, if you will allow me; and I hope it will not be wanting in "weight," nor "over-weight" in the postman's hand!

To begin with: in my communication of last week I wrote that I could not account for the difference in the colour of negatives developed with carbonate and hydrate respectively. I have now come to the conclusion that what I call the "ochre" colour by reflected light is nothing more than a slight veil, or fog, if you will, which naturally takes the colour of the reduced image—also ochre by reflected light. In the case of hydrate the image is black, and the veil partakes of the same colour. Of course this seems natural; but at first I was misled by the appearance of a kind of "bloom," which I did not attribute to fog on account of its colour, and, also, because the fog appears so thick by reflected light and so very slight by transmitted light. I am therefore doubtful whether "bloom" is the right term to use. What is "bloom?"

I intended it to be understood that my formula for "Davanne's alkali" is in connection with one ounce of water. Here I would ask whether I am correct in supposing that "Franklin's" formula is *undiluted* with water; I have used it so. I have been reading "Franklin's" communication again; what does he mean by "next morning the plates still looked well?" I should have thought it a very funny thing if they did not.

I have made yet another gelatine emulsion; the formula is as follows:—

A.—	Ammonium bromide	14 grains.
	Gum arabic	5 ,,
	Water	2 drachms.
B.—	Silver nitrate, fused (a little more than ·7-grain excess)	25 grains.
	Water (1½ drachm to dissolve, and ½-drachm to rinse with)	2 drachms.

This emulsion was kept sixteen hours, during the last hour of which fifteen grains of gelatine were added, after which the gelatine was dissolved and poured into a dish. The first washing water was proved to contain free silver nitrate. This emulsion, when washed, was made up to one ounce.

Plates coated with this emulsion are exceedingly opaque, even if they be drained almost as much as collodion; indeed, I find a drachm of emulsion will suffice for one plate of fifty-six square inches if the excess be drained off. I find that with "Franklin's" emulsion double this quantity is required to form a film with nothing like equal opacity. I do not know that there is any other advantage in an opaque plate than that of reducing blurring; but, at any rate, it is an advantage, if not counterbalanced by other disadvantages, to be able to make an emulsion "go double as far," as well as the plates to dry sooner. I certainly have never prepared better-looking and more even plates. The reason for this is obvious. It is difficult to get a perfectly-level surface, and often the plates are not of an even thickness throughout; the result is that any excess of emulsion flows to one side. When the plate is well drained this is impossible.

I have already broached the theory that silver bromide is not affected in sensitiveness by silver in excess, and that a collodion emulsion with excess of silver, but without acid, fogs through the action of the silver on the pyroxyline, and *not* on the silver bromide. The Editors are inclined to attribute to gelatine a restraining property similar to that of acid. In this way they account for gelatine emulsion not requiring

restraining acid with excess of silver. My theory is that gelatine does not form a fogging compound with free nitrate, as pyroxyline does.

It will be seen that the above emulsion contains neither acid nor gelatine—that is, for the time the excess of silver was present. Now, unless we are prepared to say that gum, also, has a "restraining action," it appears that my experience still further supports my theory. I shall refer to this again later on.

"Franklin" finds that cadmium gives dense images and (I believe) ammonium thinner ones. I find rather the opposite of this to be the case—at least with my ammonio-cadmium emulsion, with large excess of silver, and acid. My plate, developed in the same way, is somewhat more harmonious than the "Franklin" plate, though the detail is equal with the same exposure. I cannot help thinking that "Franklin" may be deceived as to the characteristics of the salts tried by himself. He says that potassium is slow, but gives thin images. Now, while I do not intend to refute what "Franklin" says, I may remark that the "Kennett" plates are made with potassium bromide, yet they are very sensitive—I believe more sensitive than the plates "Franklin" and I are preparing; but then the image is sometimes inclined to be thin.

I exposed three plates, viz., "a Franklin plate," one by my first formula, called A, and one by the formula above, called C. Exposure, three minutes on a subject lighted in part by the sun in a clear sky, at 1 p.m., with a wide-angle doublet, $\frac{f}{40}$. These plates were developed by "Franklin's" developer. The "Franklin" image is denser than that of my plate (A), though mine is ample. The detail is equal. The plate by formula C is certainly more fogged than I expected it would be, though it is full of detail. For this reason four more C plates were exposed with the same lens, at 4.30 p.m., sun shining. No. 1 plate, for five minutes; this I guessed to be equivalent to three minutes at 1 p.m. This plate was to compare with the three others, and was developed by "Franklin's" developer as before. No. 2 plate, same exposure, developed with "Franklin's" developer, only six drops instead of one drop of bromide being used. The plate kept clean, but no detail appeared. Some of "Franklin's" developer was then poured on, but without effect. Strong ammonic hydrate was also tried, but without much effect, except fog. I think *two* drops of bromide would have been nearer the mark. No. 3 plate was exposed two and a-half minutes, and developed with "Franklin's" developer. There is about the same amount of detail as in No. 3, but less fog; in this respect, however, there is not much to choose between it and No. 1, thus over-exposure is not the cause of fog. No. 4 plate was exposed for five minutes, and developed with the "Davanne's alkali" developer, no bromide. The image is very thin indeed, though a fair amount of detail is visible when the plate is held over a piece of illuminated paper. The whole image, and the sky too, is very faint.

Now I have said that this gum emulsion does not fog from the excess of nitrate; how, then, about these failures? To this I can only answer that I do not consider the fog sufficiently *decided* in every case to attribute it to the action of the silver—at least as generally supposed. Perhaps restraining acid might improve matters in another emulsion. Possibly a large excess of silver, especially with cadmium, conduces to clearness. Perhaps the proportion of gelatine is not high enough to the silver bromide to restrain fogging. At any rate, the present developer does not seem to suit the plates, and it is possible that all of them will end their days in the "pickle." This is the sort of thing a gelatine experimentalist must be prepared to see happen to many a pet project. Nevertheless, I do not intend to lose sight of this formula yet awhile. I have kept back part of this emulsion, before adding the gelatine, for a week, in order to note the effect of the continued action of free silver on the silver bromide.

I think I have a theory which partly accounts for gelatine plates sometimes blistering in my hands and sometimes not. I believe that if a plate have a predisposition, so to speak, to blister, whatever be the cause—whether dampness or decomposition of the film, or otherwise—this is aided by washing heavy solution of carbonate out of the film; this is always the stage at which my plates blister. Occasionally they bear washing after carbonate developer, without any apparent reason. Again: I continue to experience an immunity from blisters in plates developed with "Davanne's alkali," for instance; this is not so dense a liquid when used in small quantities. I believe the temperature and varying densities of liquids sometimes produce blisters. If so, it would be well to dilute the developing and fixing solutions before pouring them away.

Three parts of my C plates have blistered more or less in washing off the carbonate developer. I do not know what the primary cause may be, but I know that a larger quantity of gelatine has been accused of helping on blisters. Now my plate contains a comparatively small quantity. What is the opinion of gelatine workers now as to the effects of what I may call excess of gelatine, and *also* a minimum of it?

I believe that the colour of these negatives is much more determined by the kind of developer used than by the process of their preparation. It seems to me likely that the red-brown colour is not caused by the action of silver in excess, but by the carbonate developer; for the hydrate gives an image not to be distinguished from that of a "Kennett" plate, except by its density. Whether a "Kennett" plate would, in its turn, yield a browner image with the carbonate developer I am not certain, but reasoning from analogy this seems likely. I daresay some of my readers have used carbonate with "Kennett" plates, and could give us their experience on any difference in colour. If a bromide-in-excess plate cannot be made to give a brown image, a silver-in-excess plate *can* be made to give an olive-coloured image.

Lately, carbonate has been recommended as a means of obtaining density. Now I remember the hydrate was once recommended, instead of carbonate, for the same purpose. The late Mr. Sutton strongly urged its use; and, since then, the hydrate has been accused of blocking up the lights, and causing too great contrast. There really seems to be more "glorious uncertainty" in photography than in the law. Writing Mr. Sutton's name reminds me that he was always an advocate for the theory of the advantages accruing from the excess of neither bromides nor free nitrate; though I believe latterly the acknowledgment was wrung from him that a certain emulsion—Colonel Stuart Wortley's, I believe—was decidedly very sensitive. However, this related to collodion; may it not be true that Mr. Sutton's theory is the correct one, putting aside any organic reaction?

At the present time some of your readers may be about to try the method of transferring negatives published last week as suitable for travellers; it may, therefore, be worth while to suggest that, as gelatinised paper is not to be found among the stock of a photographer, the ordinary albumenised paper (Rive's) would probably answer equally well for the first trials. I have tried this method of transferring collodion negatives some time ago, and found it to answer exceedingly well. If the paper be rendered semi-transparent with a solution of paraffine, or Canada balsam in benzole, the negative in its reversed state will give a good print; but if an unreversed print be required there will be a falling off in sharpness. However, such a negative could, doubtless, be again transferred to glass, as when gelatinised paper is used.

My method is to float the paper on a dish of water, face upwards; then wet the glass negative well, so that the water "takes" to the film. Now drain both paper and negative, leaving a shimmer of water on the surface of the latter, then let down the albumenised surface on to the negative, beginning at the diagonal line of the plate. The rest is apparent. To transfer the film, I place the whole, when dry, in a dish of water acidified with muriatic acid. When one corner of the film is found to be loose pour off the acid water, which may be used again, and wash to get rid of the acid; when this is done, the transferred negative can be stripped from the glass. Perhaps it is doubtful whether the film would again transfer, as the albumen may be coagulated by the acid.—I am, yours, &c., HERBERT B. BERKELEY.

Cotheridge Court, Worcester,
May 10, 1876.

GOVERNMENT "CHEESEPARING."—Mr. Secretary Cross has come out in a new line—as an economist. He does not see why prisoners should have the luxury of being photographed. At present a sun picture of the face of every convicted villain is taken. The Act of Parliament so decrees it. Mr. Cross seeks to provide that in future only certain classes of criminals shall have their visages printed on paper. How much a year will this save?—*Liverpool Daily Post.*

WHAT IS ACTINISM? SOME CURIOUS FACTS.—Actinism is the chemical power which is necessary to excite germination in plants. It emanates from the blue ray of the spectrum, and is the same power which operates on the sensitive silver in photography; photography being, by the way, an entire misnomer, since the pictures are drawn by the actinic power, and not by the luminous ray. Nay, more, the blue, the luminous ray, is, like the red, a positive hindrance to the working of the actinic power. It is most difficult to obtain good photographic results under the bright sun of the tropics. Moreover, if a spectrum be thrown on a prepared photographic surface, there will be two points only where the paper is preserved positively white, namely, the points on which the red and the yellow rays are respectively collected in the spectrum. Neither will seeds germinate so long as they are exposed to bright light. Again: by another experiment it can be satisfactorily proved that the trail in the blue ray alone renders that power which is the sole agent in photography; for if we exclude the blue rays by passing all the light admitted through a yellow glass, the most sensitive photographic material may be exposed to the strongest sunshine without undergoing any change whatever. The result of experiment is that germination is excited by the actinic power of the blue ray, the formation of leaf and wood by the luminous power of the yellow ray, and the development of flower and fruit by the heat of the red ray. How the actinic ray reaches the seed in the ground is hard to understand; but that it does penetrate where the luminous ray is unable to reach is plain from experiments, which go also to show that the exclusion of the luminous ray is necessary for the operation of the actinic. Shade is always—absolute darkness sometimes—necessary for the success of the germinating process. Plant cress seed an inch deep in three plots; over the first a blue, over the second a yellow, and over the third a red glass. The seeds under the blue glass will be up days before those under the red; and of those under the red a few only will germinate. Those under the yellow will not germinate at all. It is found that those seeds which come up under a white glass, in from eight to fourteen days, will, under a blue glass, be up in from two to five days; that where thirty per cent. of seeds came up before, sixty

per cent. can now be raised; and that some seeds from tropical countries, which could not formerly be raised in this climate under a white frame, will germinate freely under a blue one. It would seem that the depth to which the air can penetrate the soil is the measure of the depth of germination. This is the practical result. There appears to be no limit to the duration of the dormant vitality of seeds so long as they are preserved from chemical change. The mummy wheat sprang up again under the actinic ray, after it had been sealed from the air for nearly three thousand years. The seeds in the coal measures have, unfortunately, undergone great chemical changes; otherwise there would be no reason why we should despair of seeing the indigenous palm groves of this land flourishing once more.—*Anthony's Photographic Bulletin.*

EXCHANGE COLUMN.

No charge is made for inserting these announcements; but in no case do we insert any article merely *offered for sale*, that being done at the small cost of one shilling in our advertising pages. This portion of our columns is devoted to exchanges only. It is imperative that the name of the person proposing the exchange be given (although not necessarily for publication, if a *nom de plume* be thought desirable), otherwise the notice will not appear.

A porcelain tray, 24 × 19, offered in exchange for trays 16 × 13 or landscape background.—Address, G. Godding, Treovkey, Pontypridd.

A whole-plate camera and lens, by Lerebours, also several dishes and baths, offered in exchange for portable half-plate camera and lens for views and portraits, with two or three dark slides.—Address, S. Sider, 419, Kingsland-road, N.

ANSWERS TO CORRESPONDENTS.

Photographs Registered—

J. Horsburgh, Edinburgh.—*Portrait of Professor Blackie.*

J. Gresty and E. B. Baker.—*Ten Portraits of Harry Vaughan.*

A. G. Massey, Armagh.—*Four Views of Bissbrook Spinning Mills.*

☞ *Correspondents should never write on both sides of the paper.*

Notice.—Each correspondent is required to enclose his name and address, although not necessarily for publication. Communications may, when thought desirable, appear under a *nom de plume* as hitherto, or, by preference, under three letters of the alphabet. Such signatures as "Constant Reader," "Subscriber," &c., should be avoided. Correspondents not conforming to this rule will therefore understand the reason for the omission of their communications.

E. V.—We hope during the summer to avail ourselves of your kindness.

H. W. D.—The conclusion at which we have arrived is that the fault lies in the distilled water which has been employed.

Country Photo.—1. Try the effect of filtering the medium.—2. The "permanent print" has faded very much. We shall retain it for a few days.

Cestrian.—The matter about which inquiry is made is one outside of our experience. We imagine, however, that an iron bed would prove much better than one of wood.

Rustic.—Nothing can be better for your purpose than very thin macintosh cloth. Subject the piece selected to a careful examination in order to ascertain that it is free from holes.

J. A. A.—From your description of the lens we venture to assert that it is one of a number of nondescript combinations made by the late J. T. Goddard—a very ingenious optician who died several years ago.

Neapolitan Photographer.—1. The address "Greenhithe, Kent, England," will be sufficient.—2. If the lens be a portrait combination it can be used as an objective for a lantern; but, owing to its length of focus, the screen will have to be erected at a great distance from the lantern if a moderately large disc be desired. A simple quarter-plate portrait lens will answer much better.—3. The Almanacs desired are out of print.—4. Mount the lenses about three and a-half inches apart.—5. The density can be avoided by modifying the development, using much less ammonia.

Medicus writes us a long and somewhat strong letter relative to an expression made use of by Mr. W. T. Wilkinson in speaking of the dignity of professional photographers in abstaining from practising dry collodion processes, and regrets that Mr. Wilkinson should have placed in suspicion his reputation for good sense and accuracy of statement by a silly mode of expression which, he hopes, was made in joke, although there was nothing to indicate such to be the case. The term "dignity," he observes, is but ill associated with a "profession" which embraces a large number of "professors" who can scarcely write their own names, and of whom, it is placed on record, many in the metropolis had not the good fortune to be the possessors of costumes fitted to ensure their admission into the society of gentlemen at a recent evening meeting.——Enough, we think, has now been made of this expression, which, we know, was intended to be received in a humourous and not in a serious light. No one is better aware than Mr. Wilkinson that, *as a rule*, professional photographers are acquainted only with the one process—the wet collodion process—by which they earn their living, and by which, we may add, many have amassed handsome fortunes.

J. W. N. writes:—"In the *History of Drugs*, by Lüchger and Hanbury, on the last page I find the following:—'Payen's gelose imparts a gelatinous consistence to 500 parts of water; it is extracted by boiling water from Ceylon moss *(Alga Zeylanica)* previously exhausted by cold water, slightly acidulated. Gelose, even in the moist state, is but little prone to change * * *. Jelly made from it will keep good for years.' Do you know if this substance has ever been tried as a substitute for gelatine in an emulsion? Its keeping qualities struck me."——In reply: we are not aware of its having yet had any photographic application.

Julia and Mary.—Our fair correspondents are desirous of ascertaining a simple method by which they can prepare paper to take with them on a trip into a country district replete with botanical treasures, specimens of which they wish to preserve in photographic transcripts. They have been recommended to wash their paper with bichromate of potash, but upon trying a sheet prepared in that way they found the resulting image too feeble and indistinct to be of much use.——We recommend them to try either a silver-paper containing a very large proportion of citric acid or a chromotype process that was brought before the notice of the British Association, so long back as thirty years, by Professor Hunt, and of which the following is an outline:—Writing-paper is washed over with a solution of sulphate of copper of about fifty or sixty grains to the ounce. When dry wash it over with a moderately-strong solution of bichromate of potash. This is all the preparation required. Mr. Hunt says that when the paper is exposed to sunshine the first change is to a dull brown, and if checked in this stage of the process we have a negative picture; but if the action of light be continued the browning gives way and we have a positive yellow picture on a white ground. In either case, if the paper be washed over with a weak solution of nitrate of silver a beautiful positive picture results. It is better to allow the bleaching action to go on to some extent, as the picture resulting from this is clearer than when the action is checked at the brown stage. To fix the pictures it is only necessary that they be washed in plain water. The sulphate of copper and the bichromate of potash may be applied in one solution instead of separately, as above described. The best proportions are—

Sulphate of copper	1 drachm.
Saturated solution of bichromate of potash	½ ounce.
Water	1 "

☞ **Editorial Communications should be addressed to "THE EDITORS"—Advertisements and Business Letters to "THE PUBLISHER"—at the Offices, 2, York-Street, Covent Garden, London, W.C.**

Clichés Pelliculaires.—We have received from Mr. D. H. Cussons, of Southport, two specimens of an ornamental negative pellicle, by the judicious use of which very pretty effects may be produced on the margin of a cameo vignette or any similar masked photograph. The object of these pellicles is to give a faintly-granulated tint to the otherwise white margin of the print. These pellicles are of French manufacture, and we understand they are much used in Paris. It is evident that there will not be any difficulty experienced in using them.

"Academy Notes."—The second year's issue of Mr. Henry Blackburn's useful *Academy Notes* cannot fail to be appreciated. It contains upwards of a hundred illustrations of the principal pictures now in the Royal Academy, Burlington House, accompanied by brief notes. These illustrations have been produced by the aid of a phototype process, the drawings—contributed in the majority of instances by the artists themselves and sketched in line—are reduced to the required dimensions by photography and surface blocks produced, thus securing the very touches of the artists themselves. The *brochure* is published by Messrs. Chatto and Windus, Piccadilly, London, W.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
May 30	Liverpool Amateur	Free Library, William Brown-st.

METEOROLOGICAL REPORT,

For the Week ending May 24, 1876.

Observations taken at 406, Strand, by J. H. Steward, Optician.

These Observations are Taken at 8 a.m.

May.	Bar.	Wind.	Wet Bulb.	Dry Bulb.	Max. Tem.	Min. Tem.	Remarks
18	30·24	NE	44	49	58	43	Dull
19	30·29	E	46	51	66	44	Cloudy
20	30·32	NE	46	52	68	40	Hazy
22	29·88	W	51	56	63	45	Dull
23	29·79	NW	52	56	61	50	Cloudy
24	29·72	SW	48	54	—	45	Cloudy

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THE BRITISH JOURNAL OF PHOTOGRAPHY.

No. 839. Vol. XXIII.—JUNE 2, 1876.

ON A NEW METHOD OF OBTAINING PANORAMIC PHOTOGRAPHS.

To render ample justice to some—nay, to numerous—subjects in nature defies the power of our ordinary photographic apparatus. Let us presume a spectator placed on an eminence from which he commands a view of undulating scenery, sloping hills, shelving cliffs, and an expanse of water, forming an extensive pictorial *tableau.* To the photographer how futile, under such circumstances, must appear his means of attempting to depict adequately the charming panorama which stretches out before his vision, and under the influence of which he is for the moment spell-bound! A small portion of such a scene is all that he at his best could present, and this, however picturesque in itself, would fail to convey a truthful idea of the view which invites the best efforts of refined taste and of the camera.

This shortcoming in photographic representation was long since perceived, and various steps were taken to provide a suitable remedy. The first method adopted consisted in the pasting of several views side by side, the junctions being as neatly effected as was possible under the circumstances. Unfortunately, owing either to want of skill in the joining or to a dissimilarity in the tones of the united pictures, they invariably presented an unpleasant, patchwork appearance. A panoramic camera having a spherical lens and a curved plate was a marked improvement upon the then existing state of affairs; but the necessity for employing glass plates having a cylindrical curvature, and also curved baths, dishes, and printing-frames, prevented the panoramic camera from proving successful. To it succeeded the pantascopic camera of Johnson and Harrison, which fulfils all the requirements of panoramic photography, as it embraces an angle of 120° on a flat plate, with a degree of definition so uniform and excellent that the microscope reveals the fact of the definition at the extreme margin being identically as sharp as that in the centre of the view. But owing to the nicety of the workmanship, which necessitates the employment of clockwork to effect the rotation of the camera during exposure, only a limited number of photographers were able to avail themselves of this ingenious instrument, and its manufacture has been discontinued.

Ten years back a patent was obtained by Mr. Victor Prout for a panoramic camera in which a long plate was impressed with a series of pictures. The first having been exposed and the camera rotated upon the stand to a definite extent, the slide containing the sensitive plate was also moved forward to a certain regulated point, the result being that the second portion of the plate took up the subject just at the point where the first left off; the third portion followed its predecessor, and so on with as many as were desired. At the point where the two pictures joined there was a slight overlapping permitted; and, to prevent the negative from being too dense in this line of union, a screen was placed a short distance in front of the portion requiring protection. We have seen pictures taken by this camera in which the union of the two subjects was so accurately effected as to defy detection. The nicety of fitting required for this camera was so great that its manufacture has also been abandoned.

Other cameras in which the principles of action were similar to those enumerated have been invented, but they are not in general use; and we now proceed to describe the method recently adopted by Mr. Leon Warnerke, who has shown us several negatives and prints thus taken by him during the last excursion of the Amateur Field Club.

We may here observe that Mr. Warnerke employs a camera of the usual kind, but subject to one exceptional variation—the dark slide is so modified as to have two rollers, one at each end, and upon these rollers is wound a long web of sensitive collodion pellicle or tissue. By ingenious means—which we shall not here stay to describe, as we purpose in a few weeks giving a detailed description of the roller-slide—the portion of the sensitive pellicle that has been impressed with a latent negative is wound upon one of the rollers, a second portion being unrolled so as to be ready for the next exposure. If a panoramic view is to be taken, the first view is exposed, the lens (which must be non-distorting) is capped, and the camera rotated upon its stand a certain number of degrees, which must be so determined that each picture shall have a small portion of view in common with the other, the necessity for which will become apparent as we proceed. The axis of rotation of the camera upon its stand is directly under the lens, so as to ensure the juncture of the two views being made without the relative displacement of objects in proportion to their distance; for we need scarcely observe that if the *lens* were moved to the distance of a few inches from the spot which it occupied when one of the pictures was being taken, any portion of the scene duplicated on the second picture would not coincide accurately with that on the first, but would bear the same relation to it that one half of a stereoscopic picture does to the other.

The pictures having been exposed, they must be all developed without dividing the pellicle. This ensures the perfect equality of both the portions, or even the three portions (should such number be requisite), of which the panoramic picture is to be composed. When developed, fixed, and dried the pellicle is divided, when each negative will be found to have a component part in common with the other. They are then placed upon a plate of glass, to which they will adhere sufficiently well for the purpose intended, and the ends of both are carefully made to overlap in such a manner as to ensure the perfect coincidence of the portions at either end common to both. This is very easily effected by holding the glass up against the light. Slight pressure causes them to adhere, and then, by means of a sharp knife, the two negatives are divided from top to bottom anywhere in the portions where they coincide. The two loose ends, which have been severed from the negatives by the stroke of the knife, are now picked away, and a coating of collodion is applied to both the negatives, by which they become perfectly united. This compound, pellicular, panoramic negative yields prints in which it is impossible to discover the place of junction.

The ingenuity, as well as the efficiency, of the method here described must be readily admitted by those bestowing upon it a little thought. It is not necessary that any special description of pellicle be employed upon which to take the negative; it is sufficient that it be flexible, moderately transparent, and easily severed when sub-

jected to the action of the edge of a sharp knife. Mr. Warnerke is entitled to the thanks of the public for demonstrating the possibility of taking excellent panoramic views by such simple means.

"WASTE NOT, WANT NOT."

Some of our German *confrères* have lately been greatly "exercised" on the oft-recurring question of the best means to be adopted for the recovery of the large quantity of silver used in photographic manipulation, but which does not enter into the composition of the image or remain in the finished print. Notwithstanding all that we have published on the subject, when we contemplate the present enormous consumption of the precious metal and consider the very small quantity actually recovered—and we have been at some pains, both by seeking information from refiners and professional reducers and by visiting considerable numbers of photographers in large practice, to arrive at something like a fair idea of the average general practice in this matter—we think the question might be very profitably reconsidered nearer home.

It has frequently been shown that probably not more than twenty-five per cent. of the silver used in printing, for example, really remains in the picture; and we are not far from the mark when we say that of every hundred ounces used in the general work of the studio from seventy to eighty might, with ordinary care, be recovered. But what is the actual fact, as shown by a number of visits paid to photographers of almost all degrees of practice, ranging from the principal and a boy to an establishment in which over thirty persons are employed? It is simply this—that, on an average, not more than ten per cent. is saved by most of those who make an attempt at saving, while actually a majority of those "interviewed" scarcely make a pretence of saving at all. In this way, from one year to another, hundreds of pounds' worth must find its way into the sewers; and, if the matter were only to become more generally known, we should not be surprised to see issued a prospectus for the formation of a company to patent and practice a process for the recovery of silver from the sewers of our larger cities.

Seriously speaking, the subject is one which, from an economical point of view, demands more attention than it seems to have secured. The suggestions for collecting the waste and processes for reducing the residues we have from time to time published are so simple, and so generally practicable, we were not prepared for the fact that in a large number of otherwise well-managed establishments we visited the only attempt at recovery was from old and disused baths. Some did "very well without bothering about saving;" others found the precipitating casks leaked and made a mess of the dark room; others found the jars frequently running over, and that the attention required was more than the saving was worth; while some had gone heartily into the matter, but, simple as it is, found the reduction, from want of suitable appliances, very troublesome, and when the residues were sent to the refiner the return yielded was so trifling that the plan was given up in disgust.

Now, if we take a photographer in a very modest way of business, consuming say twenty ounces of silver per month, this will come to two hundred and forty ounces in the year. Surely if, by the outlay of a few shillings, and by some slight daily attention on the part of even the youngest apprentice in the establishment, one hundred and fifty of this can be saved—which, even at the present exceptionally low price of silver, will amount to twenty-three pounds, fifteen shillings—the subject is well worthy of consideration, and the suggestion deserving of adoption.

We believe that, as a general rule, photographers should not attempt the reduction of their residues, because, although the operation is one of much simplicity, that kind of manipulation is somewhat foreign to their ordinary practice; and, unless they go to the expense of suitable appliances, the return would not be equal to that which could be obtained by a practical refiner. But the developing liquid, rich in silver, and the washing water from the prints can easily be run into a precipitating cask and thrown down with a chloride and the chloride of silver dried, while the trimmings of prints previous to toning, filters, &c., can readily be burnt in an ordinary grate covered by a large flower-pot to prevent loss, and as readily sold to the refiner for their full value.

We know, of course, that there have been complaints made again and again of the professional reducer retaining the lion's share of the profits; but while we believe that such complaints have been, in most cases at least, unfounded, we can assure our readers that no skilled labour or special metallurgic knowledge is necessary to enable the photographer to ascertain to a fraction the value of the *matériel* he has to sell. All that is required is to invest a shilling in an ordinary blowpipe, close the air-holes of a Bunsen burner, and turn down the flame to between two and three inches; a little practice will then enable him to get a fine blowpipe flame with which he can do anything on a small scale that can be done in an ordinary furnace. Having acquired dexterity in keeping up a steady flame he may proceed to estimate the value of silver chloride by weighing accurately ten grains, and mixing it with twice its weight of sodium or potassium carbonate, or, better still, equal parts of both. The mixture is then to be placed in a hole scooped out in a piece of good dense charcoal, and the flame brought steadily to bear on it. In a few seconds the chlorine of the silver will combine with the sodium and potassium of the carbonates, and the metallic silver will be found in the form of a globule in the charcoal. All that now remains to be done is to carefully weigh the globule and make the necessary calculation, which will show the value accurately.

The same method of procedure is to be adopted with the ashes from the paper, only, instead of the carbonates, a nitrate—preferably nitrate of potassium—must be used. The operation is so simple, and the time occupied so short, that it may be well to repeat the assay several times, and, when the results vary, to consider the value a mean of the whole; but when some slight experience has been acquired the operation is so certain that little or no variation can occur.

By way of encouragement to those who may be inclined to hesitate about going heartily into the question of saving we may say that, during our perigrinations, we were shown a very handsome tea service which the proprietor of a large establishment had presented to his wife on the anniversary of their marriage, and which was made from the silver resulting from one year's saving.

SHOULD PHOTOGRAPHERS PREPARE THEIR OWN MATERIALS?

Looking back upon the past history of photography, what a vast difference is perceptible in the conditions under which we work at the present time as compared with twenty or thirty years ago! But a few years further back—a moment, as it were, in the world's history, but a lifetime in the career of the young art—photography held the position of a mere scientific curiosity, followed by a few ardent experimentalists who devoted their time and means to the new discovery with the sole object of amusement, as no practical purpose was then served by, or perhaps even expected to accrue from, the use of the sun's rays. Now, however, what a change! Who in the early days of the art would have been bold enough to prophesy the immense amount of usefulness to which photography would one day minister? To what branch of modern art, useful or ornamental, does not photography in one way or another contribute its quota of assistance? And who will even now dare to aver that it has reached the zenith of its utility?

Few nowadays stop to think of the difficulties which stood in the way of the earlier experimentalists, and still fewer are inclined to give them credit for the researches—crude, it may be, in comparison with our present knowledge—which surmounted the obstacles and advanced photography through successive stages to its present state of perfection. Truly it may be said "there were giants in those days," who performed labours difficult of comprehension by the modern photographer, who—thanks to the numerous handbooks, combined with the assistance of the photographic chemists, to say nothing of the societies and periodicals devoted to the art—finds all obstructions removed, and may undertake his journey upon a well-marked, beaten track without the slightest fear of failure.

In the early days of the art the experimentalist had to fight not only against the difficulties arising from want of knowledge, but was also compelled to manufacture for himself many of the materials and substances which are now prepared upon a large scale for his special use, and of a quality, perhaps, far superior to the home-made article; for at that period none of the many industries which have since sprung into existence in connection with photography had been established. Even in the matter of optical and mechanical appliances the earliest photographers were thrown almost entirely upon their own resources, and the first specimens of our beautiful art-science were, doubtless, produced by means of apparatus so primitive and imperfect that no schoolboy of the present day would dream of using it. But as the new process passed from the experimental stage, and the scientific world began to recognise the germs of real utility in what was at first deemed but a chemical curiosity—as, in fact, the demand arose—so was the supply found to keep pace with it, and now perhaps there are few industries of a similar character which give employment to so many heads and hands as do the different branches of photographic manufactures.

The natural result has been that, as years have rolled on and the ranks of photographers, both amateur and professional, have gone on increasing, the efforts of the manufacturers of things photographic—whether chemical, optical, or mechanical—have continued to increase to an even greater extent, and their scope has been so extended that it is almost possible to become a photographer without possessing the faintest knowledge of chemistry or even of the principles of photography. Practically, we should not be inclined to expect much from one embarking in the art under such unfavourable circumstances; but it must be owned that, in consequence of modern facilities in connection with the chemistry of photography, the only requirements absolutely necessary for its practice are sufficient artistic taste to enable the operator to select his subject, a small modicum of common sense to assist him in focussing, and for the rest the capability of implicity following the instructions given by his mentor. How far this style of practice is desirable or practicable will depend very greatly upon circumstances; but, personally, we should have little sympathy with a photographer, *as such*, who based his claims to the title upon such slender grounds.

We must not, however, lose sight of the fact that photography is only the means to an end, and that the minor details of practice require to be modified so as best to suit the particular end in view. Thus we may examine the various motives which prompt different persons to enter the ranks of photography. We are speaking more especially now of amateurs, who may be divided into various classes—some adopting photography purely as an amusement, whilst others avail themselves of its services to assist them in some other pursuit. Those who seek simply recreation may be again subdivided into two classes, namely, such as find pleasure respectively in its scientific and its artistic aspects; whilst those, again, who employ it as an assistant may be similarly classified according as their individual requirements may be in the direction of art or science.

It must be evident that, as these various classes employ photography with widely differing objects in view, the conditions under which they work are also widely different. Take, for instance, the case of a person whose pleasure lies in the direction of the picturesque, and who, not being gifted with the power of wielding the brush or pencil, presses photography into his service for the purpose of securing transcripts of such scenes and places as may from time to time be worthy of a place in his portfolio or album. Such a man is not a photographer, and possibly his artistic feelings revolt against what *he* may consider the mess and drudgery involved in the preparation of his plates. What is photography to him but a substitute for the brush of the painter—the mere tool or instrument with which to produce a certain result? Surely it would be as unreasonable to require that such an one should manufacture his own collodion and prepare his own plates as to compel the painter to manufacture his own brushes and grind his own colours. At the same time there is no reason why, if his inclination lie in that direction and he possess the necessary knowledge and skill, he should not perform the necessary "drudgery" without interfering with the artistic quality of his results; but grant him liberty of action.

But, on the other hand, glance at the amateur whose pleasure in photography arises rather from its chemical manipulation than from any innate love of the artistic. Such instances are by no means rare, though the intimate contact with nature in its most picturesque forms which the practice of the art entails can scarcely fail in time to give birth to a love and appreciation of art which, combined with the more strictly scientific nature of photography, gives to it its peculiar fascination. This is the class which may with justice lay claim to the title of "photographer;" for it is to the carefully-worked-out results of their congenial labours that photography is indebted for its greatest improvements. Such men will be found, as a rule, to perform their own "drudgery" (if such a term be applicable in their case) as far as it may be done with advantage; for there are many of the operations in photography which, from their nature, can be carried on upon a large scale and by skilled workmen with much greater success than is likely to attend the efforts of the amateur. The true photographer will shirk none of the details of the art, however trifling, provided his results can fairly compete with those of skilled workmen; in fact, the chief value of his labours consists in their being, to the fullest possible extent, self-produced.

Of the remaining class—those who employ photography as an assistant only, supposing them to possess absolutely no taste for the art itself—little need be said; it is used by them merely as an agent capable of producing a certain result, and as such it is useless to expect them to exercise themselves in the performance of any labour which can be with advantage done for them. The painter who calls in the assistance of photography in order to secure rapidly and with a minimum of trouble a sketch of any particular figure or landscape from which to work needs not to understand the theory of the science, or to go through the whole course of manipulation. He employs the camera as a mechanical aid—not to produce an artistic effect; *that* he is content to leave to his own unaided powers.

We may here digress for a moment to remark, *apropos* of the question as to whether photography be a fine art or not, that the upholders of either view may be correct if the particular circumstances upon which they base their opinions be fairly considered. Take, for instance, the case last mentioned of the employment of photography as an adjunct to painting. As such it is but a mechanical means of producing a correct transcript of the outlines of nature—a sketch or plan bearing the same relation to the finished picture that a mathematical drawing does to the production of a Turner. Still it does not follow that it is incapable of producing artistic results, as innumerable specimens of our best photographers prove. "But," say the opponents of the fine-art theory, "it is not the camera which produces such results; it is the artist." "Certainly," we reply; "nor is it the brush and the colours which produce the painting, but the artist who employs them; and the camera is susceptible of the same artistic application, though in a more restricted form, as the brush of the painter or the pen of the poet."

But to return to our subject. We have said sufficient to show that the practice of photography may be viewed from very different standpoints, and we may add that its utility is not to be judged by any fixed rule, nor its results appraised without a due consideration of their object. We have been led to make these remarks by a consideration of the question as to how far a photographer is justified in paying for the performance of the more irksome or difficult portions of the labour involved in the production of his pictures. This may appear a matter which might well be left to individual choice, for it may be claimed by anyone that he has a perfect right to please himself in the matter; but upon looking more closely into the principle it will be seen that it is scarcely so under certain circumstances.

Take, in illustration of our meaning, the case of a public competition for a medal or prize for excellence in any particular branch of photography—say, for instance, a prize for "the best landscape." Now it is obvious that if one competitor prepare his own materials and plates, produce his own prints, and, in fact, do his work himself, he is scarcely on an equal footing with another who, as far as possible, prefers to pay for the performance of such work—who,

possibly, has had no more to do with the production of his pictures than to select the subject and focus and expose his plates.

If, however, the competition be for "the most *artistic* picture," we hold that it matters little whether the competitors perform the whole of the details of the manipulation or not. The artistic qualities of the pictures depend upon a more subtle influence than the mere mixing of chemicals. Still we think that some rule should be established fixing the limits to which such extraneous assistance is allowable, more especially as photographic exhibitions and competitions are becoming so numerous.

The great facilities which are now afforded by photographic manufacturers, in the shape of prepared plates and emulsion and the thousand-and-one preparations necessary in various branches of photography, form another reason why the matter should be looked into; and, though we have cause for believing that the great majority of the competitors and exhibitors in various parts of the world show work which is, *bonâ fide*, of their own production, we know several cases where prizes have been awarded for pictures which could certainly not be claimed as the exhibitor's own. In one flagrant instance an amateur of many years' standing was awarded a prize for a collection of pictures to the production of which no fewer than five different persons, chiefly friends, had contributed their quota—his own share consisting in having watched the exposures which were made in his own camera.

ON A SIMPLE, EASY, AND CERTAIN METHOD OF PRODUCING CARBON TRANSPARENCIES SUITABLE FOR ENLARGING.

A GREAT deal has been written of late respecting the various methods of producing transparencies suitable for enlargement. First comes the ordinary method by wet collodion, next the beautiful collodio-albumen, and lastly the most simple—which produces results that no other method can surpass—namely, carbon.

No doubt under very favourable circumstances the wet process with pyro. or gelatino-iron developer will produce results tolerably satisfactory; in fact, up to say 12 × 10 from quarter-plate, I have produced good results. Next follows the albumen process, which nothing can surpass for delicacy of texture; but it requires very great care in the preparation of the plate, or the picture will be covered with pinholes, which, if enlarged from quarter-size to 24 × 20, require a great deal of spotting out.

Nothing has been published really practical respecting carbon except by Mr. G. W. Webster in your ALMANAC for 1875, and in this year's ALMANAC by Mr. G. Willis, viz., by coating the plate with a solution of gelatine rendered insoluble by the addition of chrome alum.

I have spent much time during the last two years in endeavouring to get at the most satisfactory method of attaching the tissue to the glass plate previous to development. I found it impossible to get it to adhere to glass without markings or blisters occurring, even if the plate received a substratum of collodion. So I abandoned glass as a support for a time and employed talc, by immersing a sheet underneath the tissue in the bichromate bath, bringing them in contact when the tissue had been in about half-a-minute; now gently withdrawing them together, and firmly pressing with a squeegee; then placing away to dry, cleaning the front of the talc, and printing through. When these transparencies were developed they were all that could be desired. Still I did not feel satisfied, it being expensive to get perfect sheets of talc; so the thought occurred to me to give the printed tissue a coating of collodion. I at once had the secret of success. The following is my method of procedure:—

After taking the tissue from the printing-frame I pin it to a thin piece of board so that it lies perfectly flat, keeping the pin a little from the corner at which you wish to pour off. I now coat the printed tissue with a thin, plain collodion in the same manner as a plate is coated, and when set, but not dry, I immerse in a dish of clean cold water. I now take a clean plate and coat it with collodion also; as soon as set I immerse the plate in the dish of water with the tissue, allow them to remain for a short time, and wash until all greasiness disappears. The collodionised tissue is now brought into contact with the collodion plate under water; they are then withdrawn carefully, and placed between a few sheets of blotting-paper with a piece of india-rubber cloth on top, pressed carefully together with a squeegee, and placed aside for about a quarter of an hour. The development is effected with warm water, and, if properly exposed, the result is a perfect carbon transparency suitable for making excellent enlargements. FRANK DORÉ.

P.S.—I find the best method of judging of the exposure is to select a negative of the same quality as you want the transparency from, and print a silver print as a "pilot." When the silver print is done the tissue will have received the right exposure—transparencies requiring a much longer exposure than an ordinary carbon print.—F. D.

OUR CHEMICALS.

No. III.—*(Conclusion.)*

ACIDS.

GALLIC ACID, obtained from nut-galls, consists of small, feathery crystals, nearly white, but which, however, vary in colour—some samples being decidedly brown. Preference should be given to the more colourless sample for photographic purposes. It is freely soluble in hot water, but in cold about four and a-half grains will form a saturated solution in one ounce of water. The reason of the much greater activity of a hot saturated solution in development will be at once apparent.

Pyrogallic Acid, or *Pyrogallol*, occurs in perfectly white, brilliant crystalline plates, massed together in light, cottony masses, which, by exposure to air and light, gradually darken and, in some measure, lose their photographic activity. Colourless samples should, therefore, be selected. It may generally be relied on for purity. The writer was once accidentally supplied with benzoic acid in lieu of pyrogallic, which it somewhat resembles in appearance; but the substituted acid will be readily detected by its aromatic odour.

Nitric Acid should be colourless, and the upper part of the bottle containing it free from red vapour. Its specific gravity is about half as heavy again as water. It is very corrosive, staining the skin yellow, and must be very carefully handled, as its corrosive action will give rise to very troublesome sores. The fact of its producing a yellow stain on many organic substances—a quill, for example—may serve to distinguish this acid from most others.

Sulphuric Acid is a colourless, heavy liquid, having great attraction for water, and should be stored in well-stoppered bottles. If kept in corked vessels it will soon become dark in colour from portions of the cork becoming decomposed and falling into it. Any organic matter will cause rapid darkening, and there is most violent reaction when it is mixed with turpentine and other hydrocarbons. Its chief use in photography is in the preparation of pyroxyline, and as a detergent for removing organic and alkaline deposits from glass vessels.

Hydrochloric Acid, when pure, is colourless, giving off white fumes on exposure to the air. It may be readily distinguished from other acids by the dense white vapour which forms on its fumes mixing with those of ammonia. The commercial acid is of a yellow colour and contains many impurities, but is sufficiently good for the purpose of precipitating solutions of nitrate of silver. Diluted with water it readily removes stains of the alkaline developer from the hands and ink spots from wood or other materials.

Aqua Regia, or *Nitro-Hydrochloric Acid*, is a mixture of one part of nitric with three or four parts of hydrochloric acid, and is used for dissolving gold in the preparation of the chloride of that metal.

Bicarbonate of Soda—often purchased as carbonate of soda—is a white powder and useful for many purposes, culinary and scientific. The quality varies considerably; that known as "Howard's" is considered as the best preparation, being more soluble than the common variety. It is often called "carbonate" of soda—an appellation only correct when applied to the preparation known as "washing soda," or this in its purified forms.

Morphia Acetate is an alkaloid obtained from opium, and may be purchased as a dirty-white, crystalline powder, which inflames like resin. It is a dangerous narcotic, but useful in the preparation of dry plates with very limited keeping powers.

Alcohol, or *Spirit of Wine*, is a colourless, volatile liquid of a strength of 56° to 60° over-proof, suitable for addition to the developer, varnishes, &c. A more highly-rectified quality, termed "absolute alcohol," is used in the preparation of collodion, or for diluting the same. The only difference or probable impurity in proof spirit, rectified spirit, or absolute alcohol is the percentage of water contained in it. A rough method (if the hydrometer be not at hand) of estimating the strength is by watching the rapidity of its evaporation. On a slip of note-paper being dipped into it and suffered to dry spontaneously, if the spirit be tolerably free from adulteration

evaporation will take place rapidly; but, if much diluted, it will be some time before this takes place.

Rectified Ether is an extremely volatile, colourless fluid, boiling at a low temperature, and *not* miscible with water unless mixed with spirit of wine. Spirit of ether is occasionally supplied in lieu of the rectified ether, and consists of a solution of ether in spirit of wine. The mixture may be readily detected by adding a few drops to spirit of turpentine, which will cause no turbidity if the ether be pure, but will do so if it contain spirit of wine.

Methylated Spirit.—This *should* be nothing more than spirit of wine with an admixture of wood naphtha; but it is often impure from the presence of resinous and other matters. Methylated finish is sometimes sold for it—a preparation utterly unsuitable for photographic use, containing, as it does, a large percentage of resinous matters. Good methylated spirit should, if burned in a spirit lamp, form no incrustation whatever round the wick tube, and should not be more than slightly opalescent if mixed with water.

Glycerine is a colourless, syrupy fluid, free from odour and *very* slowly acted upon by nitrate of silver in the light—the impure kinds becoming turbid and discoloured almost immediately. It is useful for many photographic purposes.

Ammonia.—The sesquicarbonate of ammonia, or volatile salt, occurs in semi-transparent lumps of various sizes. Access of air will cause them to be converted into another carbonate of an opaque white, powdery character, and of less active chemical qualities. Lumps free from this powdery surface should be selected, and the vessels in which it is kept made air-tight. It is a good precaution never to reduce it to powder until just before use, as in a state of fine division it is more liable to become inert.

Iodine is a metalloid obtained from Kelp, and occurs in dark, metallic-looking plates. It is very volatile, and imparting a yellow stain. It is freely soluble in spirit and water if a little iodide of potassium be mixed with it. This solution is frequently used in the laboratory of the photographer. A little dissolved in spirit varnish renders it of a very non-actinic colour, the use for which, in many cases, is obvious.

Having now glanced briefly at most of the chemicals in common use amongst photographers, without any attempt to enter into their more intricate composition or qualities further than those that claim general observation in everyday work, I leave the matter to those interested to guide themselves in some measure by the outlines laid down. I may be permitted to suggest that all who really like and practice this interesting and lucrative profession should devote some of their time to the careful perusal of some of the many admirable works on photographic chemistry now published, which will not only usefully increase their knowledge, but save many an odd shilling, besides supplying various wants *supposed* to be out of reach that a little of such information would show to be close at hand.

Edward Dunmore.

NOTES ON PASSING EVENTS.

By a Peripatetic Photographer.

It is very questionable whether manufacturers of wide-angle, non-distorting lenses will feel grateful to the Editors of The British Journal of Photography for having put the public up to a method of extemporising such lenses out of *matériel* hitherto undreamt of in such a connection. There appears, however, to be no doubt of the fact that a wide-angle lens which will do work in a highly-creditable manner can be formed out of the elements of a rapid, and hence a narrow-angle, objective. I do not imagine that it will be claimed that the extemporised "wide" combination will be equally as good for the end intended as one made for the special purpose; but this is of the less consequence inasmuch as the results obtained by the one are said to be incapable of being distinguished by an ordinary observer from those secured through the agency of the other, and it is a great feat to get a 5 × 4 lens to cover, with an undistorted view, a plate of ten inches in dimensions.

The Loan Collection of scientific apparatus is the theme of the hour—at least among men of science. It is an open question whether it will prove as useful to the masses as was anticipated when it was first mooted. Who are to be educated? The masses, of course. As it is always best that the cobbler should stick to his last let me, as a practical photographer not altogether unacquainted with the history of our branch of the applied sciences, ask—What is there in this collection to instruct photographers in the science or art of their business or the general public in either these or its æsthetics? To cull an example from one of your own notices: you see a piece of dingy brass tube in a glass case; you are told that it contains two lenses (which you have no chance of fingering), and that it has a certain kind of importance in the history or practice of photography. Now, in sober earnestness, what is the value of this as a means of educating the "masses?" What is its value to scientific men? Nay, what is its value to photographers or even to photographic opticians? Or, to change the theme, what is the educational value of a packet of commercial gelatine to be seen on certain shelves upon which also repose particular chemicals and colours that a limited class of the community believe to be capable of employment in some form or other in photography? Why is gelatine exhibited "in the raw," and not albumen? How was it that no one thought of exhibiting three or four pullets' eggs on the shelves? They would have had quite as pronounced an educational value as the exhibition of a prettily-polished lens tube, a package of gelatine, or a bottle of Indian red. The Chelsea philosopher, Thomas Carlyle, takes too great a liberty with facts when he says that the inhabitants of these isles are "mostly fools;" still one cannot say that he is altogether wrong.

To Mr. Brooks is due our thanks for giving us a handy term by which to express Mr. M. Carey Lea's colloid-developer. "Collocine" is a neat word, and it will stick. The developer is now fairly before the public, and there are two opinions respecting it:—First: the positive opinion—"It is a great acquisition; I can do much better work with it than I did previously." Secondly: the negative opinion —"I have tried it, but do not find it of any advantage." This is one of those cases in which one positive opinion is worth several negative opinions, because the latter may have been arrived at under circumstances not conducive to success. *Tempus tentat omnia.*

I incline to attach more importance to Dr. Monckhoven's recent communication on carbon printing than to any similar paper which has appeared during many months past on this subject. We all know that bichromate of potash, when in contact with organic matter, displays certain vagaries which have not been well understood; but, so far as I am aware, no such systematic investigation has been made as to reveal the precise effects caused by the acidity, alkalinity, or neutrality of the various washing and other waters employed in the carbon process. It is not a little singular to find that, while the best prints on paper are obtained under an alkaline *régime*, success in the production of transparencies on glass must be associated with acidity.

No one who knows how much Mr. W. T. Wilkinson has done in connection with the cause of the unemployed among photographers would feel inclined to give him credit for other than the purest and best motives in bringing forward a subject before any photographic society; but the last appearance of this gentleman before the South London Photographic Society has laid him open to one or two minor charges—the most obvious of which is that he, an *employé* of the Autotype Company, *appears* to have taken advantage of his position as a reader of a paper to do a small stroke of business for the firm by whom he is employed. I should not like to go the length of applying the term "trade puffing" to Mr. Wilkinson's utterances on that occasion, or to say that an undue advantage was taken by him of his being one of the Committee of the Society; but this is how one of the vulgar *canaille* might put it:—"The best transparencies for enlargement is said by the writer of the paper to be carbon; but the public cannot make these transparencies—you must send them to the Autotype Company if you wish them to be properly done." The specimens shown were not done by the author at all—*he* professed complete ignorance of the *modus operandi.* No! they were done by another autotypic expert, and not a word concerning their production was suggested. The benighted members were shown a specimen and told that it had been intensified; and, when asked by what means this intensification had taken place, Mr. Wilkinson answered that he *did not know*. It may be said that in all this there is no puffery. It may be so; and if anyone will give a sound castigation to the "Peripatetic Photographer" for hinting thus much, he will try and bow his head to receive the stroke with all that meekness for the possession of which he has been justly credited.

(To be continued.)

"NATURAL SELECTION" AS APPLIED TO PHOTOGRAPHIC FORMULÆ.

I take up my pen because of an instructive leader (which I have only recently read) in the number for January 14th last requiring a few comments, and which I offer quite assured that they will be met in the same spirit that dictates them, viz., one of perfect courtesy.

Your remarks in reference to professional photographers would seem to point to the line given in Bacon's *Novum Organum*, that

"To deify error and to adore vain things"

is the object of a photographer's life, and doubtless you have a good deal of substantial argument whereby to uphold this not very flattering opinion; but I may, perhaps, be allowed permission to offer what I conceive to be an explanation, and also an endeavour at a defence.

It certainly must appear to you that photographers are somewhat tardy in availing themselves of the many excellent formulæ which are offered to them through the medium of your ably-conducted Journal, and probably this seeming callousness on our part to your labours, and that of the many clever experimentalists whose articles embellish its pages, would suggest a want of their due appreciation; but I feel very certain such is not the case, and, like myself, most, if not all, photographers carefully read and apply to their work all such formulæ as on trial are found capable of improving it.

We cannot too heartily thank the Editors of The British Journal of Photography for their able assistance and advice, which they always give in a lucid, painstaking manner; and it is to be hoped that those gentlemen will not think for a moment that *all* photographers make it their habit to ignore the value of such labours. On my own behalf, and I am sure I may add on the part of many others, I feel deeply grateful for the numerous benefits derived from the perusal of the Journal and the teachings of its Editors, feeling convinced that any one of us wishing to maintain his position as an efficient worker must sedulously study the literature, and be acquainted with all the passing events, in connection with his art.

My object now, however, is to point out that the whole history of photography may be likened to the Darwinian theory of the law of "natural selection," which may be said to apply itself to formulæ as it does to organic organisms of species; their being so would tend to prove, without any close application of the mind being required to form the comparison, that, in accordance with the laws of "suitability and fitness," processes flourish or die out—any that we are interested in taking root and reproducing themselves in proportion to their adaptability. So that the discoverers of practically-beneficial improvements will be certain to see the results of their ingenuity and genius crop up in due time, bestowing honour upon their names, and fixing themselves according to the necessities of the workers and exigencies of the public taste; whereas all other formulæ, less adapted by fitness, must cease to exist, or, if existing, must necessarily show themselves in less proportion and upon a scale commensurate with their vitality and suitability.

This theory, which is undoubtedly most applicable, will point out the reason why professional men cling to that which, according to this fixed law, indisputably proves their fitness; and hence it is I now submit that age cannot go to prove for or against the qualities of any process or formula. It should make no difference to us, as caterers for the public, whether the processes we use were dug up from the ruins of Carthage or was a formula extracted from the household cookery book of our much-revered and respected first parents. If the desired functions of old formulæ are found to excel modern adaptations let us not get grey with vexation, but live on, and hope on, carefully testing all novelties, and then adapting or rejecting them, without favour, from the antique or modern. I don't mean to assume that photographers should take a formula to their bosom, and, with mighty voice and threatening front, declare their Dulcinea to be the most perfect of her sex. This is not the construction that is to be put upon my remarks. I mean that excellence, not novelty, should be our aim; and for the production of that desired object let us use any formula irrespective of everything but its merits. In this subject we have no vague hypothesis to deal with or to endeavour to prove, but simply a comparison of work. All photographers will be quite as well aware of this as I am, and I only mention it as bearing upon the matter I ventured to take in hand.

Viewing photographic labours from a professional point of view, there are many little technicalities—"dodges" will suffice to express them—which the professional worker has acquired, and which gather round his selected species of formulæ in hundreds of trifling niceties which experience has forced into his mind. All have due weight when exigencies require their use, yet existing in so latent a form, and from long familiarity with them so overlooked or seemingly unnoticed on the photographer's part, as to sometimes leave him quite unconscious of their existence at all, but proving of vast utility where sudden emergencies develope them into requisition. No mere experimentalist has these resources. I say this also with due respect to the pioneers in the van of our march. It is not an assumption on my part of a superior adaptability of the professional over the experimentalist; but that the former through a forced closer appplication to the routine of his duties, and tracking a wider stream of experience, has his fingers' ends ready with those developed qualities which he uses in his difficulties to smoothen the way on, when the experimentalist, with his knowledge alone, would meet with complete failure. I contend that, where any important mission is about to be undertaken requiring reliable resources for successfully producing by the aid of photography any given and important object, the properly-qualified professional is alone to be relied upon for bringing it to a successful issue; while, no matter how great may be the renown of your experimentalist, if difficulties beset him his labours will be as uncertain as his formulæ.

The comparison here drawn has been made from events occurring during my short span of life in many varying fields of labour, and under many tests of skill where I often had evidence of the resources of the experimentalist and professional when working under the same precise conditions of unquestionable perplexities. The one, by his tried formula, completed his business, while the other, by his fancy formula, failed.

I will now glance over my notes of the past year, and see the result of this law of—"Natural Selection." We have, as the result, the emulsion process, the carbon process, and the photochrome process.

I place the emulsion process first, because I mean to dismiss it from notice here at once, owing to Mr. M. Carey Lea having given your readers such a full account of this fast-growing formula, and I could not hope to offer a single additional word. This writer does what practical men will do: he divests it of all but the actual necessities of the result, defying you to simplify it further without having recourse to a completely different method.

So I pass on to see what the carbon process has been doing. Here also able pens have been at work; but this is a great deal too important a branch of our industry, and which is making too great a stride in the arts, for merely a passing glance; consequently, even carbon printers of the oldest standing may read with interest the experience of a novice in the work such as I am, having only seriously studied it since the spring of the past year. For the minutiæ of its working I must refer you to Mr. J. R. Sawyer's description of it in this year's British Journal Photographic Almanac. Any difference in my work is too trifling to affect the result, and his experience is something better to hang one's faith upon. But there is just one point evidently omitted by the writer, and yet of such importance as virtually to leave his instructions there given perfectly useless without taking cognisance of the oversight. I refer to the necessity there is of what carbon printers call the "safe-edge." This is secured by painting a border of black varnish round the edge of the *clichés*, as a protection from the light of that portion of the carbon tissue, and consequently retaining its adhesive qualities. This is necessary for sustaining the print upon the support during the process of development. The black varnish may be made to suit this object as follows:—

Coal naptha ....1 quart.
British asphaltum, *Quant. suff.* to obtain requisite body.

Now follow out the instructions given in the Almanac, and, as there mentioned, no difficulty will be experienced. The result will be good, but not quite satisfactory to the eye long accustomed to the pleasing softness which characterises silver prints from good negatives. Even when we print lightly by the carbon process the lines in the resulting proofs will be much too hard. Print and develope as we will those harsh lines will refuse to soften down. When inclination accompanies spare time I will give what I conceive to be an improvement.

Photochrome work comes next in order of review. This shows promise of its assuming gigantic proportions in its commercial as well as art relations. Anyone who wishes may prove that this is something more than mere assertion by himself following out the principle with carbon tissue transparencies. A *résumé* of the process, by Mr. J. R. Johnson, will be found in The British Journal Photographic Almanac, or as follows:—Print several carbon transparencies from the same negative by aid of the autotype carbon tissue. Print them lightly, with one exception, which, having its full details, is to be placed aside. With this one exception all the remainder are to be placed upon a levelling-stand and an edging formed round their margins; then proceed to treat them with heated gelatine of the required different tints. Broad tints may be poured on, but special and local ones with a fine camel's-hair brush. The gelatine thus applied, when dry, will have sunk down to a thin consistency. Then remove all from the glass support by running a knife round the edges. Now take the one with the full details before set aside, and place all the others in contact upon it, slightly damping them. This being done, place the combination picture thus formed under

gentle pressure, and then remove it from the support and transpose upon the permanent mount, which may have a hatched or other worked-up background, according to requirement. Should the combination picture appear too raw and glaring in colour, by making a judiciously-shaded transparency by the aid of the copying camera, or by contact with a dry plate in a printing-frame, and developing by means of pyrogallic and citric acids and stripping it from the glass, its cold grey colour will tone down the offensive brilliancy and soften the too harsh lines of the carbon. The resulting picture will have a very high glaze—too much so for the pleasure of artistic vision—neither will it please a very highly-cultivated taste; nevertheless, as I said in my opening remarks, there is a great future before this or a similar process, and it will take about the same relation to coloured photographic work as the chromograph does to water-colour drawings. The means of procuring them given here is only to point out the feasibility of the work; but in all probability it will not produce anything in colours to suit a fastidious taste.

These remarks, and the application of my notes respecting the three most important processes of the present time, will show that absolute value in formulæ is not lost, but may be too crude to offer in connection with the best class of work. The practised worker for the public is much too guarded to relinquish a perfected process for one only just forming, and will decline to enter the tide of feverish excitement after novelty which characterises the masses connected with our art. D. K. Griffith.

FOREIGN NOTES AND NEWS.

The Oil of Citron or Lemon as a Preservative for Silver Paper.—Dr. Van Monckhoven's Method of Preparing Carbon Transparencies.—Combination Negatives.—A New Alloy and Source of Artificial Light.—A Varnish for Photographs, Maps, Prints, &c.

The cry resounds on all sides—"Carbon! carbon! silver is used up!" but, though less vehement in their professions of faith, there are still of photographers not a few who have not forsaken the older process to worship at the shrine of the new—the rising sun. These protest that silver is *not* "used up;" that "there's life in the old dog yet;" and, whatever the admirers of the black diamond may say, the believers in albumen and silver will not think that even experiments with preservatives for silvered paper are beneath their notice if by their means the silver process be improved. A good deal has been said lately about Mr. Devey's method of preserving silvered paper by enclosing it with the fumes of oil of lemon. As yet all reports have been favourable, and it has been strongly recommended on all sides. Now, however, Herr Fritz Haugk writes to the *Photographische Correspondenz* to say that, having been induced by M. Fleury Hermagis' recommendation to give the process a fair trial, he cannot join with the former gentleman in praising it, as the results he obtained were neither satisfactory nor uniform. For instance: he took two boxes, and in the first he placed, according to M. Hermagis' directions, a shelf of wire netting; under the latter two sheets of cotton-wool saturated with weak oil of lemon; upon the netting several sheets of silvered albumenised paper; finally closing the box with a well-fitting lid. In the second box several sheets of paper were also placed and the lid closed as before; but no lemon oil was introduced in this case. On opening the boxes some four days later the paper in the second one was found to be still quite white, while that in the box along with the oil of lemon was a good deal browned. The colour showed first at the edges from which the silver bath had been allowed to drip, then at those places immediately above the cotton-wool. At the end of five days more the paper in the second box had also begun to brown, but was still usable, while that in the fuming box had deteriorated so much as to be perfectly useless. Herr Haugk does not pretend to explain the cause of the results obtained, and which differ so materially from those of previous experimentalists; but, under the circumstances, he considers himself justified in saying that the preservative in question does not—to put it mildly—exactly merit the epithet "infallible" which has been applied to it by some of its more enthusiastic admirers.

In the *Bulletin Belge de la Photographie*, an account is given of Dr. Van Monckhoven's method of making carbon transparencies upon glass. This process, which differs in a few particulars from the ordinary method, is recommended as particularly suitable for stereo-transparencies. Most carbon printers in this country buy their carbon tissue; but Dr. Van Monckhoven seems to make his own, and for these transparencies he uses a sort specially prepared, the carbon of which is ground ten times as fine as that used for ordinary purposes. This tissue is sensitised in the usual three-per-cent. bichromate bath and dried; but, as the surface of the dry tissue is not perfectly smooth, and thus some of the finer details would be lost, he finds it advisable to give the requisite smoothness by means of a coating of collodion poured upon a perfectly-smooth, unwaxed glass plate. Tissue so prepared, in addition to its smoothness, is said to possess the property of remaining sensitive for eight or ten days if not removed from the glass plate; but it is as well to take the further precaution of laying another glass plate upon the wrong side of the tissue, in order to keep it flat and to exclude the air. The picture is then exposed, and, after being dipped into water containing one centimetre of muriatic acid to a litre of water, it is developed in the usual way, beginning with water of not more than 35° C. The print should not be too deep when looked through. The tone is a matter of taste; but, should it be too grey, it may be changed into a more agreeable violet tone by the following treatment:—Prepare the three following solutions, which will keep a long time and will serve for a great number of pictures. *A*. Dissolve forty grammes of ferric (not ferrous) sulphate in one litre of water. *B*. Dissolve twenty grammes of pure carbonate of soda in one litre of water. *C*. Dissolve ten grammes of gallic acid in one litre of water. Place the glass plate on which the picture is in *A*, leave it there for five minutes, then remove it and wash it well with water; it is then to be left for ten minutes in solution *B*, and again washed with water. By this time, on looking through the picture, it will be seen that it has assumed a slightly reddish hue. Lastly, the picture is left in solution *C* for a length of time, differing with the density of the picture. The progress made in this last bath is ascertained, from time to time, by holding the picture between the eye and the light, until, if it has not been printed too deep, it assumes the desired tone. It is finally washed with water, and, when dry, mounted in the usual way with ground glass.

M. C. Quesnay, of Lille, gives the following method for producing in one printing a portrait combined with a border in any design, and in the same or two different tints. In taking the portrait the glass is first cleaned and treated with an ethereal solution of wax; it is then collodionised, sensitised, and exposed in the usual manner. Upon the ground glass of the camera an oval is traced of the exact size the portrait is required, and between the prepared plate and the shutter of the dark slide is fixed a mask, cut to the exact size of the oval upon the focussing-glass. By this means the photograph is produced with a transparent border. After washing the negative flow over it a fifteen-grain solution of gelatine to the depth of about one-twentieth of an inch, and set it aside to dry in a place free from dust. When quite dry it is coated with ordinary transfer collodion, and strips of paper are gummed upon the borders; when the latter have become dry the pellicular negative is detached from the glass by cutting round the edges with a sharp penknife. A second negative is then produced of the object or surface intended to be used as the ground for the border, a mask being employed in such a manner as to leave a transparent opening in the centre the exact size of the portrait previously produced; the two negatives are then superimposed and printed from in the ordinary manner. If the background or border be required in a different tint the print, upon removal from the frame, must be washed thoroughly to remove free silver. With a brush dipped in solution of hyposulphite of soda go carefully over the portion representing the border, and again wash thoroughly. After toning the portrait will have the usual purple or violet-brown tone, while the border will be represented by a sepia tint. This plan may be modified by cutting out the portrait from the pellicular negative, and gumming it, together with an open mask representing the pattern of the border, upon a piece of glass or mica, and proceeding as in the former case.

It is said that in Bunsen's laboratory a very ignescent metal or alloy is being prepared in large quantities. In burning it emits a light of great actinic power, and Dr. Weissenborn, of Berlin, thinks that this metal may become of great importance in photography as a source of artificial light. It is so ignescent that it emits sparks on being merely scratched with a needle. Rather too ignescent that!

The *Pharmaceuten Central Anzeige* gives the following formula for a varnish for cards, photographs, &c.:—Put from thirty to forty grammes of light yellow, transparent dammar lac into a flask and pour over it about 180 grammes of pyroxylic spirit. With occasional shakings the mixture may be left for about a fortnight at an ordinary drying temperature, at the end of which time the resin, now thoroughly saturated with the spirit, may be decanted off, care being taken not to disturb the sediment. Then to four-sevenths by weight

of this varnish add three-sevenths by weight of thick homogeneous collodion (or to forty grammes of varnish thirty grammes of collodion), shake them up well together, let the mixture settle, and store in well-stoppered bottles. To use the varnish draw vertical strokes across the surface to be varnished with a soft beaver-hair pencil dipped in the varnish. After the first coat of varnish dries there is a clear glossy surface, and after two or three coats have been applied a film is formed which remains glossy in spite of the action of the weather, and retains its elasticity in all cases when the cards have to be rolled. This last quality renders it especially suitable for the protection of maps, plans, and topographical drawings, and the fact that it has no chemical influence upon colour is an argument in favour of its use as a varnish for photographs in cases where extreme glossiness of surface is deemed desirable.

UPON DOUBLE SALTS OF CADMIUM AND IODISING THE COLLODION.*

D.—*Iodide of Cadmium with Iodide of Ammonium.*

1. Single Ammoniac Iodide of Cadmium, $2\,NH_4I - 2\,CdI_2 - H_2O$, crystallises easily on the evaporation of a solution of equal atoms of iodide of ammonium (145 parts) and iodide of cadmium (366 parts). I calculated the formula from the following analysis :—

$2\,NH_4I\ 2\,CdI_2\ H_2O$.		Computed percentage.	Ascertained percentage. A.	B.
6 I	= 762	73·27	73·01	73·14
2 Cd	= 224	21·54	22·02	22·30
$2\,NH_4$	= 36	3·46	—	—
H_2O	= 18	1·73	1·95	1·88
	1040	100·00		

Also, from a solution coloured yellow by free iodine (if one allows the tainted alkali to soak through filter-paper) one may obtain perfectly colourless, flat, glittering needles, which do not change on being exposed to the air—a property by which they are advantageously distinguished from the rapidly-yellowing and very hygroscopic iodide of ammonium. Large and beautiful crystals may easily be obtained by crystallising slowly. In vacuum the water is easily and completely given up; at 100° C. a little ammoniac iodide begins to be given off along with the water, and at 120° C. the former escapes much more perceptibly. On being fused the salt is completely decomposed by giving off the ammoniac iodide. It is soluble at 15° C. in 0·90 parts of water, in 0·88 parts of alcohol, and in 2·4 parts of ether.

2. *Twofold ammoniac iodide of cadmium*, $2\,NH_4I - CdI_2 - 2\,H_2O$, is prepared like the foregoing by solution of the proper quantities of ammoniac iodide (145 parts) and cadmic iodide (183 parts), and evaporating the solution until crystallisation sets in. The solutions must be concentrated on account of the great solubility of the salt; it then crystallises pretty easily in moderately-large distorted cubes, which generally adhere together and form one united mass of crystals. The yellow colour—which is derived from the mother lye being generally strongly coloured by the ammoniac iodide—adheres more obstinately to these crystals than to those of the preceding salt; but it may yet be easily removed by being well pressed between filter-papers. If one should wish to have the salt, crushed by pressing, in the crystalline form it can easily be recrystallised from the smallest possible quantity of hot water, and will then be absolutely colourless.

This salt can, by a simple artifice, be at once obtained perfectly white even from solutions strongly coloured by free iodine; that is, by placing in such a solution some metallic cadmium, which, combining with the free iodine, forms cadmic iodide and thus removes the colour from the solution. In that case it is advisable to add rather more than the computed quantity of ammoniac iodide in order to facilitate the formation of the double salt by the cadmic iodide formed thereby.

The composition has already been ascertained by Croft. My analysis confirms his formula :—

$NH_4I - CdI_2 - 2\,H_2O$		Computed percentage.	Ascertained percentage. A.	B.
4 I	= 508	73·42	73·25	73·26
Cd	= 112	16·18	16·20	16·35
$2\,NH_4$	= 36	5·20	—	—
$2\,H_2O$	= 36	5·20	5.46	5.53
	692	100·00		

This salt is not affected by the action of the air. Under the air-pump over sulphuric acid it gives up its water completely, and behaves on being heated like the salt D 1. Its great stability and durability, which allow of its being stored for an exceptional length of time, in conjunction with its hereafter-to-be-described photographic properties, make it peculiarly adapted for an iodising salt. No other iodising salt unites in itself so many advantages as this one. It is not only durable by itself but also in collodion (much more so than either sodic or potassic salts), does not thicken the collodion like cadmic iodide, and gives a more sensitive collodion than the latter. At 15° C. it dissolves in 0·58 parts of water, 0·70 parts of absolute alcohol (0·794), in 8·8 parts of ether, and in 1·8 parts of alcoholic ether (1 vol., 1 vol.).

I was unable to obtain a fourfold ammoniac-cadmic iodide analogous to the bromide salt. On evaporating a solution of four atoms of ammoniac iodide and one atom of cadmic iodide, the ammoniac iodide and twofold ammoniac-cadmic iodide crystallised separately.

E.—*Iodide of Cadmium with Iodide of Potassium.*

1. *Single potassic iodide of cadmium*, $KI - CdI_2\ H_2O$, is formed with much greater difficulty than the analogous ammoniac salt. From a solution of equal atoms of cadmic iodide and potassic iodide crystals of cadmic iodide are first formed, then the long needles of a new salt having the foregoing formula, and lastly the salt E 2.

$KI - CdI_2 - H_2O$		Computed percentage.	Ascertained percentage. A.	B.
Cd	= 112	20·36	20·44	20·52
3 I	= 381	69·26	69·07	69·00
K	= 39	7·09	—	—
H_2O	= 18	3·27	3·43	3·51
	550	100·00		

It is formed as very long white crystals which resist the action of the air, but which cannot be recrystallised without decomposition (into cadmic iodide and salt E 2). One proportion of the salt dissolves in 0·93 of water at 15° C.

2. *Twofold potassic iodide of cadmium*, $2\,KI - CdI_2\ 2\,H_2O$, like the corresponding ammoniac double salt, is obtained from 239 parts of cadmic iodide and 166 parts of potassic iodide. This salt was discovered by Croft, with whose formula my analysis given below agrees :—

$2\,KI - CdI_2 - 2\,H_2O$		Computed percentage.	Ascertained percentage. A.	B.
Cd	= 112	15·21	15·43	—
4 I	= 508	69·21	69·05	69·13
2 K	= 78	10·67	—	—
$2\,H_2O$	= 36	4·91	5·11	5·08
	734	100·00		

It crystallises easily in white, irregular octahedrons, which withstand the action of the air and can be recrystallised from hot water without decomposition, and which give up their water completely at 100° C. One part dissolves at 15° C. in 0·73 parts of water, in 1·4 parts of alcohol, in 24·5 parts of ether, and in 4·5 parts of equal volumes of alcohol and ether. This salt can only be used advantageously for iodising collodion when the latter is free from bromine, as it would combine with the bromine to form potassic-cadmic bromide (which see). In ether solutions all the bromide is thrown down as potassic bromide (and also the cadmic bromide, contrary to Monckhoven's opinion). (See B 1.)

F.—*Iodide of Cadmium with Iodide of Sodium.*

1. *Single sodic-iodide of cadmium*, $2\,NaI - 2\,CdI_2 - H_2O$. From a solution of one molecule of sodic iodide and one molecule of cadmic iodide by far the greatest part of the cadmic iodide is thrown out as crystals; on further evaporation needles of a new double salt show themselves, but these are very small in quantity, and soon the separation of the salt F 2 begins. The following is the result given by analysis :—

$2\,NaI - 2\,CdI_2 - 5\,H_2O$.		Computed percentage.	Ascertained percentage.
2 Na	= 46	4·09	19·82
2 Cd	= 224	19·96	—
6 I	= 762	67·91	67·75
$5\,H_2O$	= 90	8·02	8·60
	1122	100·00	

The salt crystallises in thin, deliquescent needles, as clear as water.

2. *Twofold sodic iodide of cadmium*, $2\,NaI - CdI_2 - 6\,H_2O$, is formed easily like the corresponding potassic salt, and was first prepared by Croft. I got the following composition, which is exactly the same as Croft's analysis :—

$2\,NaI - CdI_2 - 6\,H_2O$.		Computed percentage.	Ascertained percentage. A.	B.
2 Na	= 46	5·95	—	—
Cd	= 112	14·43	14·32	14·66
4 I	= 508	65·65	65·40	65·48
$6\,H_2O$	= 108	13·97	14·23	14·29
	774	100·00		

It forms what appears to be long, very deliquescent tetrahedrons, which are soluble at 15° C. in 0·63 parts of water, in 0·86 parts of alcohol, and in 10·1 parts of ether.

In order to give a better general view of the points of solubility of these salts, which are of great importance to photographers, I give a table the points of solubility in which were fixed by me after a great number of experiments.

* Concluded from page 122.

One proportion by weight of the salt dissolves at 15° C. in the under-mentioned proportions by weight of—

Combination.	Formula.	Water.	Absolute alcohol, density 0·794.	Ether, density 0·729.	Alcohol ether, 1 vol. 1 vol.
Bromine and cadmium	$Cd\ Br_2\ 4\ H_2O$	0·94	3·4	250	16
Bromine and ammonium	$NH_4\ Br$	1·29	31·5	890	112
Bromine and sodium	$Na\ Br\ 2\ H_2O$	1·10	15·9	1200	—
Bromine and potassium......	$K\ Br$	1·62	750	5000	1700
Iodine and cadmium	$Cd\ I_2$	1·13	0·98	3·6	2·0
Iodine and ammonium	$NH_4\ I$................	0·60	4·0	210	20
Iodine and sodium	$Na\ I\ 2\ H_2O$	0·55	12·0	360	—
Iodine and potassium	$K\ I$	0·71	68·3	370	120
Single ammoniac cadmium bromide	$2\ NH_4\ Br\ 2\ Cd\ Br_2\ H_2O$	0·73	5·3	280	34
Fourfold ammoniac cadmium bromide	$4\ NH_4\ Br\ Cd\ Br_2$	0·96	is dec	omp	osed
Single sodic cadmium bromide	$2\ Na\ Br\ 2\ Cd\ Br_2\ 5\ H_2O$	1·04	3·7	190	—
Single potassic cadmium bromide	$K\ Br\ Cd\ Br_2\ H_2O$	0·79	is dec	omp	osed
Fourfold potassic cadmium bromide	$4\ K\ Br\ Cd\ Br_2$	1·40	is dec	omp	osed
Single ammoniac cadmium iodide	$2\ NH_4\ I\ 2\ Cd\ I_2\ H_2O$ ..	0·90	0·88	2·4	—
Twofold ammoniac cadmium iodide	$2\ NH_4\ I\ Cd\ I_2\ 2\ H_2O$ ..	0·58	0·70	8·9	1·8
Twofold sodic cadmium iodide	$2\ Na\ I\ Cd\ I_2\ 6\ H_2O$ ..	0·63	0·86	10·1	—
Single potassic cadmium iodide	$K\ I\ Cd\ I_2\ H_2O$	0·94	—	—	—
Twofold potassic cadmium iodide	$2\ K\ I\ Cd\ I_2\ 2\ H_2O$	0·73	1·4	24·5	4·5

In the following table I give a tabular view of the molecular weights of those single and double salts with which it might easily happen to one to confuse a collodion iodised with one salt with a double salt containing the same proportion of iodine or bromine.

Compound.	Formula.	Proportional Weights.
Single ammoniac cadmium bromide ..	$2\ NH_4\ Br\ 2\ Cd\ Br_2\ H_2O$	758
Single potassic cadmium bromide	$K\ Br\ Cd\ Br_2\ H_2O$	818
Single sodic cadmium bromide	$2\ Na\ Br\ 2\ Cd\ Br_2\ 5\ H_2O$	840
Single ammoniac cadmium iodide	$2\ NH_4\ I\ Cd\ I_2\ H_3O$	1040
Twofold ammoniac cadmium iodide ..	$2\ NH_4\ I\ Cd\ I_2\ 2\ H_2O$	1038
Twofold potassic cadmium iodide	$2\ KI\ Cd\ I_2\ 2\ H_2O$	1011
Twofold sodic cadmium iodide	$2\ Na\ I\ Cd\ I_2\ 6\ H_2O$	1161
Ammoniac bromide	$NH_4\ Br$....................	588
Potassic bromide	$K\ Br$	714
Sodic bromide......................	$Na\ Br\ 2\ H_2O$	834
Cadmic bromide....................	$Cd\ Br_2\ 4\ H_2O$	1032
Ammoniac iodide	$NH_4\ I$	870
Potassic iodide	$K\ I$........................	996
Sodic iodide......................	$Na\ I\ 2\ H_2O$	1116
Cadmic iodide......................	$Cd\ I_2$	1098
Iodine	I	762
Bromine	Br	480

I believe that I have here given all the data required for coming to a conclusion as to the value of the double salts and for their practical application, and will pass on to the detailed description of the properties imparted to the collodion by the different salts.

The chemical analyses were worked out in the laboratory of Professor P. Weselsky, to whom I now render my best thanks.

JOSEF MARIA EDER.

A DAY IN THE COUNTRY.

SINCE the first days of my photographic apprenticeship until now landscape work has been my hobby, yet the Fates have never permitted me to indulge it to the top of my bent. Chained to the studio by the various caprices of "sitters," the past ten years have slipped away as a dream, and only now and then has a precious day been seized to escape from the foul atmosphere of a crowded town to the pure air and delightful influences of the country.

It being the happy custom to close our establishments on bank holidays, the last of those favourite days found me prepared to use it to the utmost—to spend it in a little village about ten miles distant, and to secure as many good negatives as possible. With this end in view I arranged with a photographic friend to bear me company and lend me assistance. This, I must say, he did most heartily. Of stout and burly limb, the tent—a light one, but still heavy for me—was a mere plaything in his hands; and from the beginning to the end of a most enjoyable day I found him a useful and pleasant companion.

On the evening before starting I gathered together the various parcels, which were as follow:—A very light and compact dark tent, on the model of Rouch's but far lighter; two tripods strapped together; a light box containing a very portable $7\frac{1}{2} \times 5\frac{1}{2}$ bellows camera; air-tight bath, plates, and chemicals. The three packages—tent, tripods, and box—were easily carried between us.

We left home about seven o'clock, the clear, still air giving promise of a glorious day. On reaching the railway station the tent was stowed in the guard's van; the other parcels we took with us. But by this time the sky was somewhat overcast, and throughout the day, although it was fine, the sun was hid, and all the negatives taken, though clear and sharp, were lacking in that brilliancy which only sunshine can give.

After a short journey the train stopped within a mile of our destination, and, an omnibus being in waiting, we took our places and were soon set down at the top of the lane leading to the scene of our intended labours. It was only about half-past nine o'clock when we arrived; a long summer's day was before us; not a leaf was stirring, and only a little sunshine was needed to make it a perfect day for our purpose.

On reaching the bottom of the lane, the trees meeting overhead, the village school met the eye, and through the half-open door the hum of children's voices could be heard, tempting us to take a glance within; but we decided, after a little consultation, to proceed first to the church, about two hundred yards to the left. The contrast here between the busy town we had left and the complete silence of the scene was quite impressive.

After a few moments spent in drinking our fill of the wholesome country air we proceeded to work. A corner of the churchyard having been selected, and our tent set up, in less than five minutes a plate was in the bath and we were ready for work.

One of the reasons for working the size of plate before mentioned was to test the qualities of the front lens of a 5×4 medium-angle doublet. The front lens reversed is about eight inches focus, and covers a whole plate well. Throughout the day we found it all that could be desired for general landscape work, which is more than can be said of the double combination.

I suppose all photographers feel a little nervous until they see the first negative whenever they spend an occasional day in the country; but the first plate exposed on the north side of the church was as clear as possible, and we were now entirely free to spend the day in securing negatives of anything around which commended itself to our taste.

The negatives were developed, well washed, and fixed, so that they could be brought out of the tent to be closely examined. They were then safely stowed away until our return, and then slightly intensified. By this method of working little water was needed and little time lost. As a proof of this we obtained in the course of the day, from ten till five o'clock, eighteen thoroughly good negatives. The tent was shifted twice in the day; it was only necessary to screw the top on the bath, let down the supporting rods, and we were ready at once to change our quarters.

Negatives were secured, in succession, of the old thatched inn, the village church from several points, the brook winding its way through the village street, the parsonage, and a very picturesque farm-house, and last, but not least, some cottages in ruins.

During the early part of the day we had been unmolested; but after four o'clock the village children discovered us, and we were at once beset. So pertinacious was their curiosity that we almost despaired of getting the last three negatives, until my friend came to the rescue. Calling them all around him he sat down upon the bank of the little brook, just out of the range of the camera, and commenced to repeat to them, in a most solemn and impressive manner, that ever-wonderful story—"This is the house that Jack built." Either the out-of-the-way spot we had selected was so benighted that they had never heard the story, or my friend repeated it so impressively, that I secured my negatives, and had time to admire the self-absorption of the group. The solemn tones of my friend and the awe-struck faces of the children were enough to make one wish for a negative of the group; but the setting sun forbade the attempt.

We packed up the tent and camera, washed our hands in the little brook, and set our faces homeward. Carrying the tent to the top of the village lane we saw the omnibus approaching, which conveyed us to the station, and we were soon at home refreshing ourselves with a cup of tea.

The experience of the day fully confirmed my expectations. A good lens, a light camera, and a very portable tent, with a friend who willingly takes his share of work, is the acme of photographic bliss.

CADMUS.

Meetings of Societies.

LIVERPOOL AMATEUR PHOTOGRAPHIC ASSOCIATION.

THE usual meeting of this Association was held on Tuesday evening, the 30th ult., at the Free Public Library and Museum—the President, Mr. W. Atkins, in the chair.

The minutes of the previous meeting were read and passed.

A resolution was passed, "That until the end of the year the meetings shall be held on the last Thursday in each month, instead of the last Tuesday in each month." The change of evening was made in order to facilitate the arrangements of the Liverpool School of Science Committee.

Mr. W. H. Kirkby exhibited some prints and the negative of the solar spectrum, showing many of the Fraunhöfer lines.

Mr. J. H. T. Ellerbeck gave his experience with Mr. M. Carey Lea's collo-restrainer. He found that with a developer prepared with some which he had brought he was enabled to obtain negatives with half the exposure obtainable with the usual acetic acid developer. He (Mr. Ellerbeck) showed examples to prove that a reproduced negative, much softer than the original negative, could be produced by using the autotype transparency tissue first to obtain a transparency, and then again from that to obtain a negative.

Copies of the presentation prints for 1875 and 1876 were exhibited, and were examined with great interest and admiration.

The Secretary then gave an account of the proceedings of the Council regarding the choice of the presentation prints.

Both pictures had been enlarged with much care by the Autotype Company from negatives taken by Mr. O. R. Green during his *Run for Sunshine.* Mr. Green had, with his usual kindness, placed his negatives at the disposal of the Association for the production of their presentation prints.

The print for 1875 is a *View of the Tiber from Ponte Rotto*, enlarged from two negatives $7\frac{1}{2} \times 5$ to 24×10. The difficult task of joining these two negatives to form one enlargement had been most successfully overcome by the Autotype Company.

The print for 1876 is a *View of the Forum, at Rome*, from a point of view from which many interesting spots may be noted. This is also a most successful enlargement, 23×18, from a negative $7\frac{1}{2} \times 5$. They are both printed in permanent autotype.

The success of these enlargements will, no doubt, give as much pleasure to Mr. Green—who has taken so much trouble to produce them—as the members will feel on possessing such magnificent specimens of their art, as they are the finest presentation prints the Association have had.

The Rev. H. J. Palmer said he, no doubt, represented the unanimous feeling of the members in expressing himself as greatly delighted with the choice of the pictures, and he begged to move a most hearty vote of thanks to Mr. Green for the opportunity he had given them of possessing such valuable photographs.

The vote was carried by acclamation.

The Rev. H. J. Palmer, during the evening, took three groups of the members on plates prepared by the gelatine process some six months ago.

The President, in moving a vote of thanks to Mr. Palmer, said that it always enhanced the interest of the meetings when members could see some practical work going on.

The meeting was shortly afterwards adjourned to *Thursday* evening, the 29th instant.

THE PHOTOGRAPHIC SECTION OF THE AMERICAN INSTITUTE.

At the February meeting of this Section Mr. H. J. Newton, President, occupied the chair.

Mr. J. A. Todd, of Sacramento, Cal., at the invitation of the President, exhibited some large carbon prints, and gave an account of his experience in introducing the process. He had visited London, Brussels, and other places in Europe, and intended to establish the business of carbon printing in New York City. There was an advantage in the latter process—that in carbon work one did not touch the side of the film the light had acted upon, but worked on the opposite side; and in copying could make the enlarged negatives equal, if not superior, to the original. In producing large pictures, even of life size, he would make the negative of the card size, and enlarge the image by the ordinary enlarging camera.

Dr. Miller inquired whether Mr. Todd made the glass positive with the camera, and the enlarged negative from that, in making a large carbon picture.

Mr. Todd replied that he had done so. He repudiated the solar camera. He preferred a hole in the window. He would not use a condenser, but place his negative between the hole in the window and the camera lens. He remarked that the lines were smaller in the finished carbon picture than in the original, in consequence of the contraction of the gelatine film.

The President remarked that when there were large orders for prints it would be convenient to duplicate negatives in that way if they could be made as sharp as the originals, and thus the order could be filled very quickly. He said that carbon prints were superior to silver prints, especially in permanency. Carbon prints were as permanent as book printing, and he would be happy to see it introduced and take the place entirely of silver printing. There were very few silver prints which did not change in a short time for the worse, and finally become worthless. He (the President) exhibited an emulsion plate, as a specimen of portrait work, taken on a cloudy day. The time required for preparing a plate was less than a minute. The emulsion was flowed on the plate, and, as soon as it was set, an alcoholic preservative was flowed over it at once, and it was ready for exposure. In explaining his process for redeveloping he had presumed that he was talking to photographers who understood the fundamental principles of photography, and had not thought it necessary to go into details. For instance: he did not think it necessary to say that if they had iodide of silver with silver in excess on their plate, and exposed it to the light, it would fog. There was no way in which they could get a fog by his process of redevelopment, unless in the light. When they poured the iodide solution over a plate it formed the iodide by decomposing the bromide of silver. The iodide being in excess was not sensitive to light; but when they put more silver on there was silver in excess, and that must be done in the dark. Any photographer ought to know that it would produce fog if he undertook the redevelopment in the light. The iodide of silver being formed and developed, the next thing was to fix it in hyposulphite of soda and dissolve all the iodide of silver that had not been acted on in the formation of the image. Then the negative would be perfectly clear, and free from fog.

At the March meeting of the Section a package of thirty-four large photographic views was received from Mr. Anthony, illustrating Canadian scenery. They were made on bromide emulsion dry plates by Mr. Henderson, of Montreal.

The Secretary said it was seldom that they had such a fine collection of pictures presented for their inspection. The wildness of some of the scenery and the effect of light on the snow scenes were most remarkable.

The President said that there was great credit due to Mr. Henderson, not only for the results as specimens of photography, but as works of art; and, as they were done by the emulsion process, they deserved special notice. The nitrate bath work could not at all compare with that. As in the case of snow represented in those views, where they had the development under control, its advantages were readily seen.

Dr. Miller stated that he had been making some views lately with the emulsion process, and was very successful as far as he went.

The President remarked that he hoped to make an emulsion that would be adapted for portraiture in the gallery, which would reduce the time considerably as compared with the bath process. Since the previous meeting he had made a few more negatives which would go to show what there really was in the process. He could make a portrait in less time than he could with the usual bath. He made a negative of Mr. Bierstadt the other day, and was sorry he could not show prints from it, as it was thought to be so good that one of Mr. Bierstadt's friends had carried off all the prints with him. He (the President) then exhibited a negative of a Parian marble statuette, which was exposed in the camera ten seconds, and a print of his son and daughter, with twenty seconds' exposure. Fifteen seconds, he said, might be better, while with the old bath process he would give forty seconds. He hoped at the next meeting to have some finer specimens to exhibit, and (looking at Mr. Bierstadt) some better *subjects.* He also showed some views of Niagara Falls, which he had taken while there last week. The actinic power of the light at the Falls was at least five times greater than here.

The Secretary alluded to a statement made at the meeting of the Photographic Society of Chicago, in which the President (Mr. Hall) gave the formula or method of preparing albumen, and it struck him so favourably that he tried it, and he liked it the best of any he had ever used. The preparation was very simple. He tested its keeping qualities, and it was that day just as good as when first made. The white of an egg was beaten up and let stand over night; that was mixed with eight ounces of water; then to eight ounces of water was added seven or eight drops of carbolic acid, but the quality was not stated, so he concluded that it was the commercial carbolic acid. After that was filtered it was ready for use. Mr. Hall also spoke of rubbing the albumenised plates with a tuft of cotton dipped in alcohol. In that way he removed a certain amount of albumen, and rather assisted the bath in coagulating what was left on the plate. That formula seemed so simple that he would recommend it to the members.

The President said he had published the formula some half-dozen times, and the reason he devised another method than the use of ammonia in albumen was that he found in developing a plate by the alkaline process the albumen preserved with ammonia would cause blisters, and thus leave the glass. He therefore devised the mode which he then employed, viz., carbolic acid, which was mixed in eight ounces of water, and the albumen in eight ounces. They were then mixed together, and the tendency to coagulation was such that the albumen did not leave the glass. He did not find that the alkaline developer affected the albumen so prepared. Now this formula was exactly what he published about a year ago, and it had been published three times within the last year.

Dr. Miller believed the best way was that recommended by the President, when he first suggested to him the use of carbolic acid in the substratum; at first he had too strong a solution of acid directly with the albumen, but he since found out that the President's method of preparation was the best.

The meeting was then adjourned to the first Tuesday in April.

BERLIN PHOTOGRAPHIC SOCIETY.

The annual general meeting of the above Society was held on the 7th April, under the presidency of Dr. Vogel. The annual reports by the Treasurer and Secretary were presented, from which it would appear that the affairs of the Society seem to be in a flourishing condition generally. In the course of the past year there were nineteen ordinary, and one festive, meetings. It would, of course, be quite out of place to enter into details here as to the papers of interest read before the Society during the past year, as they have nearly all been mentioned already in our columns.

Before passing on to the stated business of the evening the President read a communication relating to Hommell's plasto-photographic process, in which it was said that it consisted of the production of a double negative taken upon a plate prepared and silvered upon both sides. In reply to a question put by a member,

The President said that he did not know whether Hommel's process was patented in Prussia or not. He (Dr. Vogel) then proceeded to say that he had recently received a circular in which two eminent artists recommended the process of Herr Reinecke, of Pyrmont, for the production of Denier's effects, which is called "plastic aquatint photography." He thought that though the recommendation of the eminent artists in question might be valuable (considering the results produced by Herr Reinecke), from an artistic point of view, they could not be allowed to carry the same weight from the photographic point of view, as it was not to be supposed that those artists were so well read in photographic literature as to be able to pronounce at once as to the absolute novelty of a process.

Herr Techner's sketch for the diploma of membership was then laid on the table, and was universally admired. It will shortly be reproduced by a photo-mechanical process, and a copy sent to every member.

The President then showed some negatives the film of which had been reversed under water in the way described in our *Foreign Notes and News* some few weeks ago, and three views, by Captain Waterhouse, of the celebrated banyan at Calcutta—the largest tree in the world.

Herr Prümm showed some carbon transparencies upon glass with which he means to decorate his reception-room. The spaces between the pictures are filled in with dark brown calico pasted on to the glass; and, not to make the room too dark, the upper panes will be left uncovered.

Herr Schaarwachter remarked that he had also decorated the windows of his reception-room with carbon transparencies; but instead of the brown calico he had used blue glass, as he thought that in clear weather the effect of the absolutely opaque spaces would be unpleasant.

There was no further business calling for remark.

Correspondence.

EMULSIONS AND DEVELOPERS.

To the Editors.

Gentlemen,—I think it ought to be mentioned, in justice to the late Mr. Sutton, that when he was experimenting with emulsions they were by no means so perfectly made as they are now. My plates, to which Mr. Berkeley alludes, were then very sensitive but lacking in density—a fault that I did not cure till Mr. Sutton had taken up other branches of investigation. Mr. Sutton always acknowledged most honourably and freely the labours and investigations of others, and it was never necessary to "wring" from him acknowledgments of things good and useful.

I fear (to go to another subject) I have missed an article or letter in your columns. Mr. Berkeley alludes to "Franklin's" developer. Would he kindly give its formula, as the only one I have seen recommended by "Franklin" in the articles I have noticed has been as nearly as possible the exact formula of the strong developer as first published by me and adopted by Mr. R. M. Gordon for his gum-gallic plates?—I am, yours, &c., H. Stuart Wortley.

Rosslyn House, Grove End-road, N. W., May 29, 1876.

[The formula for the developer above alluded to will be found described in an article by "Franklin," at pages 184-5. The developer is really that of Major Russell—the proportions of the ammonia, bromide, and pyrogallic acid being modified by each operator to suit the requirements of the particular kind of plates he is using at the time. For example: the large proportion of ammonia recommended by Colonel Wortley and "Franklin" answers admirably with the collodion plates of the one and the gelatine plates of the other; but it will not answer as well for the "Liverpool" or "Russell" collodion plates, or for the gelatine plates of Mr. Kennett, as the modified proportions recommended by each of these manufacturers. We feel assured that neither Colonel Wortley nor "Franklin" would desire that any friend should place them in the false position of claiming to be inventors or discoverers merely because of the application of a recognised fact, viz., that a strong developer acts more energetically than a weak one—a discovery (if "discovery" it be in the case of a developer) which was made and published twenty-two years ago.—Eds.]

THE SCIENTIFIC EXHIBITION.

To the Editors.

Gentlemen,—In the two notices you have published of the Scientific Exhibition I do not see any account taken of the fine series of photo-transparencies shown by Colonel H. Stuart Wortley. They are of large size—15 × 12 in.; and, being displayed in an advantageous position at the top of one of the cases, these eight photographs make a good show, and are entitled, I would submit, to be enumerated amongst the most striking photographic objects in the Exhibition.

Yesterday I paid a third visit to South Kensington, and am more than ever impressed with the interest and importance of the Loan Collection, and would strongly urge upon my brother photographers the advantage of taking an early opportunity of inspecting so interesting and instructive an Exhibition.—I am, yours, &c., John Spiller.

2, *St. Mary's-road, Canonbury, N., May* 31, 1876.

[In our second article on the above Exhibition, in our last number, page 242, favourable allusion was made to Colonel Wortley's series of transparencies.—Eds.]

MR. M. CAREY LEA'S NEW DEVELOPER.

To the Editors.

Gentlemen,—I quite agree with your correspondent, Mr. W. Cobb, in your last issue of May 26th, respecting the value of the new collo-developer. My experience with it at the beginning was anything but encouraging, but with me the developer seems to improve with age; and if Mr. Cobb will try it more diluted he will find that it possesses other qualities. One drop to ten ounces of plain iron solution will be quite sufficient, and if the *proper* exposure be given printing density can be obtained without after-intensification.

I have now several promising experiments in hand, which I hope to complete in the course of the week, and will bring the results before the next meeting of the South London Photographic Society.—I am, yours, &c.,

Stratford Green, E., May 29, 1876. W. Brooks.

DIGNITY, DRY PLATES, AND COLLOCINE.

To the Editors.

Gentlemen,—I am very sorry that my remarks at the meeting of the South London Photographic Society should have offended amateur photographers. Kindly allow me to supplement your remarks upon the subject, and to explain fully what I really meant, which was that, although dry plates gave far better transparencies than the wet process, yet professional photographers did not use them. The word "dignified" was used in a humorous sense, and not at all as Dr. Nicol and "Medicus" have taken it. The remarks you yourself made at the same meeting will uphold this statement, as you then stated you could put a stronger term than the word "dignified" to professional photographers who ignored the many qualities that dry plates possess over the wet process.

I myself have worked nearly all the dry processes, and have secured results that with the wet process would have been impossible; and I am of opinion that if photographers would only use dry plates a little more they would never regret it, but would rather be glad they had done so instead of always using the one process for everything.

If anything I have written has offended anyone I can only tender my apology, and promise in future to stick to seriousness and never touch the humorous again.

There is one thing I should like to name in connection with my paper, and that is—it was not the paper I had prepared for the evening; but as a gentleman who should have helped me in the affair was not able to do so, I, at the last moment (five o'clock on that evening) wrote the paper now under discussion, and in my hurry did not take into consideration the fact that it would be printed as well as read.

Now that I am writing I should like you to allow me to record the verdict of myself and several photographic friends in favour of Mr. M. Carey Lea's new collo-restrainer, which now, in our practice, takes the place entirely of acetic acid, both on the score of efficiency and cheapness. One sample of the restrainer was purchased, and the other made at home; but both act alike.—I am, yours, &c., W. T. Wilkinson.

1, *Stanley Villas, St. Mark's-road, Hanwell, W., May* 30, 1876.

Photography under Difficulties in Africa.—One of our passengers, wandering two miles from the trading stores towards the native village, fixed his camera to take a dry-plate view of the collection of huts, when a crowd of women came forth, and, seeing a bright eye below a piece of black velvet as he was focussing the view, shrieked wildly that an evil eye was fixed upon the town. They speedily collected a mob, and, commencing to stone the amateur photographer, smote his head and smashed his mahogany case, but the lens escaped injury. It was useless to try to explain matters, for suitable language was wanting; but the sudden appearance of a trader, who with a stick struck out right and left, and the production of a coloured vignette, the wonder of inspecting which, like a ray of civilisation illuminating obtuse intellect, changed the current of their thoughts, caused them to cease stoning and smile, and the man still lives.—*Liverpool Porcupine.*

EXCHANGE COLUMN.

I will exchange dark box on wheels suitable for large work, for quarter-camera and lens, chair, or rolling-press.—Address, PHOTO., 84, King's-road, Chelsea.

A rolling-press (12-inch rollers) will be exchanged for a scenic background or pedestal. Difference (if any) will be adjusted.—Address, J. P. Procter, 289, Rochdale-road, Manchester.

For rolling-press costing £4 15s., and large studio camera costing £30, I want in exchange doublet lens, good cabinet lens, backgrounds, &c., or offers.—Address, TEAR, 12, Clapham-road, S.W.

A first-class waggonette dark carriage, completely fitted-up, in splendid condition, to work plates 15 × 12, to be exchanged for a good large rolling-press, which must be in good condition.—Address, A. GOSNEY, Sherborne.

ANSWERS TO CORRESPONDENTS.

☞ *Correspondents should never write on both sides of the paper.*

HERBERT B. BERKELEY.—Received. In our next.

A. B. C.—The enamel on *cartes* is effected by means of collodion and gelatine in precisely the manner so often described in former volumes and Almanacs

SOUTH LONDONER.—Previous to applying the iodised albumen give the plate a coating of ordinary collodion; and, after it has set, immerse it in a vessel of water for a short time until all "greasiness" shall have disappeared. The albumen is now applied, the superfluity of the first first portion being allowed to drain off into the sink from one corner. Apply a second portion and retain the overflow from it in a separate bottle, as it will do for the first application to the next plate.

ARGUS.—You are labouring under two misapprehensions, which we shall endeavour to remove. First: the "instantaneous moonlight views" by the late Mr. Breese were not *moonlight* pictures at all, but were taken in powerfull sunlight. If the view be carefully selected with regard to the disposition of the light, an excellent moonlight *effect* (not a moonlight photograph) may be obtained by giving a very brief exposure. Secondly: the negatives were taken by a stereoscopic portrait lens of no quicker action than can be obtained every day.

FINEM RESPICE.—Lime water is prepared by taking, say, half-a-pound of lime and slaking it by first sprinkling upon it a little water, and then shaking it well up with ten or twelve pints of water. After standing for three hours the lime water is ready for use. It is found that cold water dissolves more lime than when the temperature of the water is raised. Allow the deposited lime to remain at the bottom of the stock-bottle, and decant off the required portion, adding plain water to the stock-bottle and giving it a shake before placing it aside.

B. H.—1. It is a pity you should have mixed up such a very large amount of toning bath on the eve of leaving this country for so long a period. However, by making it decidedly acid by the addition of hydrochloric acid before being put away, we believe you will find it quite good when you return to England again. Before using it you must render it slightly alkaline, and, if necessary, add a little gold.—2. Precipitate the silver by means of chloride of soda, and sell it to a refiner.—3. Yes; gelatine will answer your purpose quite well.

MICROSCOPIST.—A French quarter-inch object-glass that will show the markings of *P. formosum* must be considered as a good one, assuming, as we here do, it is one of the small-angle, cheap, triple combinations. We think the *formosum* to be a fair test for an objective of this kind; but not for a moment would we consider it a test for an *English* quarter, because a "two-thirds" of English make will, if good, show these markings very distinctly. We are quite aware that several London-made objectives of this power will *not* do what we have said, but these invariably have a very limited angular aperture.

S. S. C. (Edinburgh).—The explanation of the phenomenon observed by you is simple. The silver bath from long use became saturated with iodide of silver; the stronger the solution of silver the greater is the quantity of iodide retained in solution. No sooner had you diluted this strong negative bath by a copious addition of water than it lost its power of holding the iodide in solution; hence the precipitate. Remove it by filtration, and if, by the argentometer, you find the bath too weak add a few crystals of nitrate of silver to bring it up to the required strength; but avoid making this addition until by filtration the precipitated iodide shall have been removed.

K. MAXWELL.—A charming effect in the printing of vignetted portraits may be obtained in the following manner:—Print the vignette in the usual way, and after removal from the printing-frame expose it to light, having previously taken the precaution of shielding the printed portion by a suitable mask. This may be done by cutting out a piece of brown paper about the size of the portrait and pasting it upon a plate of glass. Hold this glass with the mask in front of the portrait during the exposure to light, and keep it moving very slightly while doing so, in order to prevent the formation of a hard outline. When the margin has become darkened to the requisite degree tone and fix as usual.

DOUBLE DARK SLIDE.—Mr. Baynham Jones reminds us that the double dark slide for obtaining paper negatives, described by us last week, was invented by him, and that he has used it for dry plates for at least a dozen years. We had forgotten for the moment that, some time ago, Mr. Jones directed our attention to the capabilities of his slide for this purpose. Mr. Jones says:—"I have just greatly improved it; instead of putting in the plates from the top, which rendered it necessary to remove the slides, I now insert them from the bottom, closing the aperture with a thin steel slide made of a piece of clock-spring." Mr. Jones will see that in the slide we described last week the plates are, as in the slide he has just improved, inserted from the bottom, the aperture being closed with a thin slip of wood.

ALICE MILLER.—For clearing up transparencies try the effect of iodine dissolved in a solution of cyanide of potassium. Every photographer is aware of the fact that a strong solution of cyanide of potassium will dissolve away an image on glass; but the action is irregular and cannot be easily controlled when the solution is very strong, while if the strength of the solution be reduced its solvent power is too slow to be practically useful. The addition of a little iodine to this solution immediately confers upon it the power of gradually dissolving away the image, and this with so much uniformity as to place the operation under complete control. A suitable solution may be prepared by adding iodine to the cyanide solution until it becomes coloured, and then dropping into the solution a small bit of cyanide sufficient, when dissolved, to effect the decolouration of the liquid. This must now be diluted with water until of a suitable degree of strength.

ESKIMO has been to the Arctic regions, and has also been gathering eggs (eider duck) in great quantities there. He wants to know from Mr. R. W. Thomas (or others interested) if he thinks there is any chance of making a large amount of money by the man or, say, couple of men who would venture to stay out there the necessary time every year for five or six years—supposing the supply of eggs to be great—the albumen being dried and packed away whilst out there. He desires, also, a rough idea of the value of eggs—say per thousand—when so manipulated, so that he might form his own conclusion of the profit when compared with the expenses. The eggs are very large. Also, an idea of the necessary apparatus required for drying, and its cost. Also, whether it would be better to act in consort with some one at home helping to find the expenses and outfit, and knowing how to manipulate albumen and teach those going out, managing, also, the sale at home. The privations would be very great, so that a man would like to have made a little competency in a very short time to undertake it.

J. D.—HOLDER FOR STEREO. SLIDES.—Our correspondent refers to a want the mere mention of which ought to prove sufficient to our energetic manufacturers to ensure a supply. He says:—"Thinking that there may probably be many other people who are similarly situated to myself, I have taken the liberty of begging a corner in your correspondence column to ask if, for those who have accumulated a large number of stereoscopic views (say chiefly in sets of a dozen or so), there has ever been designed a holder or case at once *convenient* and *ornamental*. We know that to pile them up in several lots on a drawing-room table or side-board means a litter directly they are touched, and many a pleasant moment or two is dispensed with on that account. We have our albums and scrap-books for portraits and views; is there nothing for the stereos.—so much more attractive?"——Such a want as that indicated could be very easily supplied, and, had the stereoscope continued to be the fashionable instrument it once was, doubtless it would have been. We remember that at the Photographic Exhibition, five years ago, Mr. Meagher exhibited a picture-holder of a kind something similar to that suggested by "J. D." It possessed, however, greater capabilities, for it was made to contain several dozens of card slides and a dozen glass transparencies. It was greatly admired, and, if reconstructed in a simpler and cheaper form, it would, we think, supply the want referred to by our correspondent.

SOUTH LONDON PHOTOGRAPHIC SOCIETY.—At the next meeting of this Society, to be held in the Rooms of the Society of Arts, Adelphi, on Thursday next, the 8th inst., Mr. Aldridge will read a paper *On Obstacles to Photographic Progress*. Mr. Brooks will also make a further communication respecting Mr. M. Carey Lea's new developer, and Mr. Warnerke will exhibit panoramic negatives and prints obtained by the method described in another page.

SHEFFIELD PHOTOGRAPHIC SOCIETY.—The members of this Society had their first excursion on Thursday to Haddon Hall, and, notwithstanding the unfavourable state of the weather, between thirty and forty negatives were obtained, the majority being on dry plates. The first plates were exposed *en route* on an old picturesque cottage at Baslow, the journey being resumed through Chatsworth Park *via* Rowsley, and the return journey *via* Bakewell, where the members did ample justice to the good things provided by Mr. Wells, mine host of the Royal Oak.

METEOROLOGICAL REPORT,

For the Week ending May 31, 1876.

Observations taken at 406, Strand, by J. H. STEWARD, Optician.

THESE OBSERVATIONS ARE TAKEN AT 8 A.M.

May.	Bar.	Wind.	Wet Bulb.	Dry Bulb.	Max. Tem.	Min. Tem.	Remarks
25	29·77	NE	47	48	56	47	Raining
26	29·82	W	48	50	56	44	Raining
27	29·86	NW	51	54	62	49	Dull
29	30·24	NW	52	60	72	52	Hazy
30	30·14	W	51	57	75	48	Bright
31	30·08	N	53	59	—	51	Cloudy

CONTENTS.

THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 840. Vol. XXIII.—JUNE 9, 1876.

WET PLATES WITHOUT THE USE OF A SILVER BATH.

Though, as a rule, amateurs devote themselves almost entirely to the practice of landscape photography, very many of them make their first attempts in the art in connection with portraiture, and would doubtless continue to pursue that branch if the results obtainable were at all proportionate as regards quality to ordinary landscape work. That a difference exists in the quality of the respective work turned out is undoubted, and is easily explained by the fact that in order to produce the highest class of work in portraiture it is absolutely necessary to be provided with a studio, or at least some arrangement for modifying and controlling the direction of the light employed; while in the production of a landscape it is merely necessary to catch the best possible natural illumination. Upon the latter point, of course, depends the artistic value of the resulting picture, but it is not a question of the erection of an expensive studio, or intricate system of blinds and sunshades, which very few amateurs would care to do.

Still, under some circumstances, it is possible with very simple appliances to secure, if not the very best, at least very passable, results; and as most amateurs have experienced the importunity of friends eager to be photographed, they are fain to make the best of the possibilities which remain to them. But another difficulty arises—of minor importance perhaps to many, but still serious enough to others—from the necessity of employing the nitrate of silver bath. The latter, when in regular daily use by an operator who thoroughly understands its management, is kept in order with very little trouble; but in the case of an amateur who, possibly, has occasion to use his bath no more than once a month, and then perhaps at the very shortest notice, the probabilities are much in favour of its being out of order just at the very time it is required for use, and by the time it has been restored to working order the necessity for its employment may have disappeared. It is not to be wondered at, then, that the practice of portraiture is confined to a comparative few amongst amateurs; and we have no doubt that any process combining the rapidity and simplicity of the wet process with immunity from bath troubles will be hailed with delight by a large section of our amateur readers.

The question was partially solved by the late Mr. Sutton, two or three years ago, by the publication of his "moist" process, which combined the ordinary wet-plate rapidity with the keeping and other qualities of the best dry plates. In this process, however, the bath was still retained as a necessary portion of the manipulations, though from the nature of the details of the process most of the usual wet-plate annoyances were obviated. No special treatment was required to keep the bath in working order; indeed, to one accustomed to the preparation of dry plates by means of the bath, the manipulations were rather simplified than otherwise. We venture to say, however, that the rapid spread of the practice of emulsion photography has so far reduced the number of those employing the bath for dry-plate purposes, that to follow Mr. Sutton's method would entail, in the great majority of cases, the preparation and use of a special bath, the costliness of which would militate greatly against its general adoption.

Turning our attention, however, to emulsion processes, it has been found that equally good results may be obtained in this direction, and with a great diminution in the trouble and expense involved in the operations; and it is with a view of once more calling attention to a process whose sphere of usefulness may be extended with advantage that we pen these lines.

To briefly state the principles of the process, we may say that it is based upon the employment of an emulsion plate in the wet or moist state after the application of a slightly alkaline organifier, the development being performed by the ordinary alkaline method. Plates prepared in this manner are found to be extremely rapid, the exact measure of their sensitiveness having been variously stated by different experimentalists as "nearly as rapid," "quite as rapid," and "about twice as rapid" as wet plates, while the manipulations are so greatly simplified, and the troubles usually experienced in connection with wet plates so much diminished, that it becomes a pleasure instead of a trouble to work the process. The plates, too, after preparation not being liable, as bath plates are, to deterioration may be prepared a number at once, and stored in a suitable manner for hours, or until required for use—a fact which enhances their value for the purpose of taking dark interiors when a lengthened exposure is necessary.

The best form of emulsion to employ we are unable to point out, having succeeded almost equally well with several; but, whatever its composition, it should work as rapidly as possible in the dry state. Except as it affects the keeping qualities of the emulsion itself it is scarcely necessary to use what are known as washed emulsions; that is, those which may be poured upon the plate and dried without further treatment, though the latter will be found to work as well as any. An unwashed emulsion, in order that it may retain its working qualities and its sensitiveness unimpaired for a considerable length of time, must contain soluble bromide in excess, or, if the silver be in excess, then an acid or other restraining substance becomes necessary. The first, except under special circumstances, is liable to produce insensitiveness, while the latter is objectionable on account of the limited time during which the emulsion will keep good and the difficulty in thoroughly removing the free silver previous to the application of the alkaline organifier. On the whole, we prefer to use an emulsion containing a very slight excess of soluble bromide, and prepared according to the method first suggested, we believe, by Mr. H. Cooper, of allowing the constituents of the collodion to be acted upon, during a portion of the time required for sensitising, by an excess of silver nitrate, which is afterwards neutralised by the addition of a further quantity of bromide. The formula which has given excellent results, both as regards quality and rapidity, is as follows—

Plain collodion	1 ounce.
Bromide of cadmium (hydrated)	12 grains.
Nitrate of silver	12 ,,

Having dissolved say from one-half to three-quarters of the bromide in the collodion, sensitise with the full quantity of silver, and after about twelve hours add the remainder of the bromide. It is well to acidify the collodion slightly previous to the addition of the silver, as a means of preventing fog, which is liable to occur when the excess of silver is employed without the restraining acid. A little more trouble

may be taken in the sensitising with good effect. Add to the collodion, in the first place, four grains of bromide, and at intervals of from eight to twelve hours add, successively, six grains of silver, four grains of bromide, six grains of silver, and, finally, the remaining four grains of bromide. After twelve hours' rest the emulsion is ready for use, and will keep for a considerable length of time.

The plates, after coating, are passed into a dish of distilled or boiled rain water, from which they may be removed shortly after the greasy appearance has gone; or, if more convenient, they may be left to soak for a considerable time—indeed a longer soaking is rather to be preferred, as it removes a larger quantity of the soluble bromide, and conduces to greater sensitiveness. From this water they are transferred for a minute or two to a dish containing the organifier, or the latter may be poured on and off the surface of the film a few times. The system of dipping the plates direct into the organifier without previous washing is not to be recommended, as the preservative bath becomes gradually charged with soluble bromide, which tends to the production of insensitiveness and uncertainty.

We have tried various modifications of the organifier and find the results to differ chiefly in rapidity and colour of the image. When the highest point of rapidity is not desired we prefer to employ diluted albumen (about one to twenty) rendered slightly alkaline; but greater sensitiveness is gained by the use of gelatine (five grains to the ounce of water), while the addition of from five to ten grains of gum produces a still further increase of sensitiveness and modifies in a favourable manner the colour and quality of the image. As regards the alkali to be used we have found, after repeated trials, that bicarbonate of soda behaves in the most satisfactory manner. Ammonia, on account of its volatile nature, appears to lose its force in a very short time, while its solvent action upon the film is apt to prove injurious if it be used in too great quantity. Bicarbonate of soda is free from these defects; not being volatile its effect is permanent, and possessing no solvent action upon silver bromide it is not liable to injure the film. The formula we should recommend for the organifying solution is as follows:—

Gelatine	50 to 60 grains,
Gum arabic	50 to 100 ,,
Bicarbonate of soda	15 ,,

the gelatine and gum being varied according to the effect desired.

Upon the point of exposure we can say nothing, but must leave that to actual experiment as the only reliable means of attaining a satisfactory result. The development is performed in the usual way by means of alkaline pyro., the preservative having first been removed. It does not materially differ from the ordinary development of dry plates, except that it is more rapid; and, as nearly every individual operator has his own particular method, we had perhaps better allow each to form his own judgment in the matter.

In conclusion: we can strongly urge upon the attention of those readers who have occasion at distant intervals to prepare rapid plates for portraiture or for other purposes the advantages of this simple method. The emulsion, which is equally applicable to the preparation of dry plates, is capable of producing at the shortest notice wet plates which are little, if at all, inferior to bath plates in the points of sensitiveness and quality of negative, and which may be used in the studio or kept moist for a considerable period for use in the field or for lengthy exposures.

A PHOTOGRAPHER'S NOTE-BOOK.

At the last technical meeting of the South London Photographic Society we exhibited a note-book which, we stated, was calculated to be of very great service to the landscape or tourist photographer, and we promised our readers that at a subsequent period we should give them full details of the note-book in question. The present month being that in which many photographers are engaged in preparing for an "out" with the camera, we consider it a suitable time for redeeming that promise.

The note-book was designed by Captain Fox for his own use, and a duplicate copy with which he favoured us has been found very convenient indeed. Every second page is ruled, the divisions having printed headings, so as to afford the greatest possible facility for making an entry of every circumstance connected with the taking of a negative which a photographer might desire to remember. By reference to this note-book at the time of development any special plate containing a particular subject can be selected for operation; and as all the circumstance of lighting, lens, exposure, and process are entered no haphazard work need be at all involved in such operation.

But not only does the note-book afford a handy guide to the developing of a plate; it also becomes very useful for future reference, giving the history of each finished negative in a concise form. With these preliminary remarks we present in *facsimile* a leaf of the note-book with the various headings which experience has dictated as being requisite to preserve a record of each negative.

No.	Date.	Lens.	Aperture.	Exposure.	Subject, Process, Light, and Observations.

The respective headings speak too plainly for themselves to render comment necessary. We may state that under the heading "Aperture" the unwise system adopted by some photographers of giving merely the number of the diaphragm employed should not be tolerated, but, instead, the much more intelligible system of the insertion of a figure having a direct relation to the aperture as compared with the focus of the lens; for example, the number 12 indicating the aperture is one-twelfth of the focus of the lens. This represents a constant amount of illumination no matter whether the focus of the lens be long or short, and whether the actual aperture be either the decimal part of, or more than, an inch.

We have said that each alternate page is plain paper. This affords an opportunity for making any other useful entry suggested at the time, and for which no provision is made in the ruled page.

CARBON TRANSPARENCIES.

Agreeably with a promise made a fortnight ago, to lay before our readers the results of further experiments with carbon transparencies, we purpose now to give an account of some recent trials we have made which, although yet far from being concluded, seem to us to contain the germs of great practical usefulness.

Continuing the experiments with one sample of tissue we found good reason to re-endorse our recommendation to enlargers to give the process by means of carbon transparencies a fair trial, feeling assured its true value would force itself upon them as soon as the details of the novel change had been mastered. Having absorbed the whole of one batch of tissue in obtaining the results spoken of we next set to work upon a fresh sample altogether, which gave results so markedly dissimilar (though, we believe, with identical treatment) that we at once became aware that the qualities and peculiarities of the medium itself formed a very important factor in gauging the probabilities of success. Not only did the sample vary in working—solubility, rapidity, &c.—but in colour also. We found upon looking into the matter that we had unwittingly been using two samples prepared for entirely different objects. Up to the present we are far from being convinced that for either one or the other purpose the right formula has been exactly hit upon; but we must not anticipate. The exact names as given to them by the manufacturers—the Autotype Company—are "special portrait tissue" and "transparency tissue." We believe we are correct in stating that the Autotype

Company themselves—presumably the best able to form a correct opinion on the subject—employ the transparency tissue in making their transparencies for enlarging. Sufficient details for use will be found in our article just referred to; but so far our own experiments point most decidedly to the use of the special portrait tissue—preferably that of a purple tint—for the purpose.

It has long been known to the producers of the highest class of results by either dry or wet plates that the most suitable kind of transparency for the purpose was one, primarily, full of detail, and, secondly, not too dense—a plate relatively much weaker than a good printing negative being amply sufficient in density. Indeed, we have seen one composed entirely of gold, made by treating a wet collodion transparency with ammonia after toning with a strong and acid solution of gold, which, though of surpassing thinness and delicacy, gave a very good printing negative. The colour by transmitted light was the usual green of attenuated gold, and it possessed a charm and delicacy peculiar to itself; the non-actinic character of the green light it transmits having, doubtlessly, something to do with the success of the results. As we say, this delicacy and avoidance of too great density are the leading characteristics of the transparencies used by noted operators in obtaining their best negatives; and it is just such a class as we have found ourselves able to obtain by the use of the special portrait tissue—so much so that we unhesitatingly give to it the palm when comparing the various tissues.

The class of pictures we obtained by the "transparency" tissue was very like such as would be obtained by the use of a strong bath and bromo-iodised collodion in the wet process, though possessing less of their contrast and a greater universal distribution of detail combined with general softness. We would at once say that with either tissue we obtained excellent results, and it is only as giving an opinion upon their comparative merits that we say so much in favour of the portrait tissue. It may be asked—Would not, then, the ordinary tissue, such as for years past the Company have been supplying, answer the purpose? We can only say that in our trials, before we could obtain sufficient graduation of tone in the transparency, the printing had to be so deeply done that we found it impossible to get the print to adhere to the glass for developing; and, further, the tissue did not appear to be of nearly so delicate a texture as in either of the other two.

We should very much like to have the opinion of our readers as to the merits of the two classes of tissue, for our recent conclusions have been shared by one or two we have discussed them with; and it will be seen by our ALMANAC that so far back as last Christmas one writer stated he had found the special transparency tissue to possess no advantage over the other for enlarging purposes. Attention may be called to one other point in our experience in obtaining a proper amount of gradation, and that is the very protracted length of time needed in printing, instead of getting three proofs through to one in silver. As usual in carbon printing, the transparency took longer time than a silver print would have done.

We did not allow our experiments to stop at this stage, and we have just finished a series with the transparency tissue to discover in what special direction it might be of use. We find it particularly suitable for magic lantern slides, any amount of delicacy or depth being obtainable with it—it being here also a well-known fact that over-dense transparencies, as we have often stated, are not at all suited for the lantern. Anyone who has tried one half of a broken glass stereoscopic transparency against one of the single ones sold for the purpose will at once acknowledge the justness of our views in this connection.

Another quality—and the most important of all—is the suitability of the carbon "transparency" tissue for reproducing negatives. We have found it as well adapted for that purpose as the special portrait tissue is for enlarging purposes. The reproductions we have obtained have not been of a sufficiently complete character to enable us to present them for inspection, but they are quite enough advanced to show that results of first-rate character are obtainable; in fact, it will be impossible in one case to point out which print is from the original and which from the duplicate negative. We apprehend that as the process of carbon printing spreads a very large sphere of usefulness will be discovered in this direction, any amount of intensity in the carbon negative being obtainable by the use of permanganate of potash.

Upon reviewing our results we find the whole of them possess the characteristics pointed out in the article from which we gave an extract in our issue of the 26th ult., viz., a far too general prevalence of pinholes in the negatives—caused by coarse particles of pigment in the transparency—and for this reason we say we think that the best formula for making the pigment is not yet found. This is the one drawback in a process otherwise almost perfect in its results. It is, however, of course only noticeable to any offensive extent in those parts showing delicate modelling; as, for instance, the face, hands, &c., in portraiture. We would throw out the suggestion that the manufacturers should prepare a tissue purposely for enlarging containing no pigment proper, but merely a colour having the character of a dye only, permanency being a matter of no import whatever. Thus we do not see why a suitably-selected aniline colour should not entirely replace the carbon or other pigment used, and then we should get an entirely homogeneous film, perfectly free from this one very glaring fault. Failing the possibility of this suggestion being carried out, we would further propose that a tissue with scarcely any pigment at all contained in it should be made. It could then, we should think, be dyed by immersion in a bath of aniline colour afterwards, as these colours possess the quality of attaching themselves readily to animal textures. These projects seem to us perfectly feasible, and if they should be adopted we shall be glad to have been the means of advancing this interesting process a step nearer to perfection.

THE hints contained in Dr. van Monckhoven's paper upon carbon printing, which we translated at page 233, are of interest, not only to professional printers, but also promise to be of even greater value to less experienced amateurs. Those who have "dabbled" in carbon printing without having the time or means to thoroughly study its principles have doubtless frequently met with little troubles which, while scarcely amounting to failures, have still detracted to an appreciable degree from the pleasure to be derived from thoroughly successful work. Who, for instance, when working in the hot summer months, has not been troubled by the persistent manner in which the tissue softens and dissolves in the bichromate solution, or runs into streaks or drops away from the paper support during drying? Then, again, the varying degrees of solubility which the unaltered gelatine exhibits during the process of development—whether it arise from error in exposure, too long keeping of the tissue after sensitising, or from variations in temperature—frequently form a serious obstacle to the peace of mind of the *occasional* carbon printer, though to the professional it may be a mere matter of daily experience. By taking advantage of the action respectively of acids and alkalis upon bichromated gelatine we think much of this uncertainty might be removed, or, rather, a ready remedy found. *Apropos* of this action, it is worth inquiring into the point whether or not it might be utilised in connection with gelatine emulsions. It is well known that a gelatine emulsion film containing silver bromide is much less soluble than a film of pure gelatine, and that water raised almost to the boiling point will remove the developed image with difficulty. Is this owing to the mechanical action of the particles of silver present? or does it arise from some specific chemical action of the substances employed in forming the sensitive film?

SULPHURIC ACID FOR DRYING SENSITISED PLATES. CAN IT ACT INJURIOUSLY?

A RECENT communication from one of your correspondents mentions a curious experience. Some gelatine emulsion plates were dried over sulphuric acid, and in drying became slate colour, which change was attributed to an action of the "fumes" of the acid. Common sulphuric acid gives off no fumes at ordinary temperatures, and the whole theory of the use of sulphuric acid for drying substances in chemical analyses proceeds upon the supposition that the vapour of the ordinary hydrates of sulphuric acid has no tension at ordinary temperatures. *A priori* I scarcely see any reason why sulphuric acid should not disengage traces of vapour at ordinary temperatures; other substances with high boiling points—mercury, for example—

do so. And yet, in analyses, substances dried over sulphuric acid are not found to absorb any, even such substances as would be readily attacked by that acid.

My own experience with dry plates has been that sulphuric acid is without action on them. Until I used washed emulsion I dried my plates invariably in a tight box over sulphuric acid. Since reading the communication just mentioned I have made the following experiment:—

A piece of red litmus-paper was taken, and passed through water to which a drop of solution of caustic soda had been added, leaving the litmus-paper just long enough to turn it blue. It was then well washed in running water. The object of this was to get a blue test-paper in which there should be no excess of alkali, and which should show the highest degree of sensitiveness. A conical jar was then taken, some ordinary sulphuric acid was poured in, a cork fitted to the mouth of the jar, and the litmus-paper fastened to the under side of the cork before inserting it, letting it hang down and nearly touch the surface of the acid. The jar was then set aside for several weeks, during which time the paper was occasionally moistened. At the end of this time there was shown no trace of reddening; the paper preserved its blue colour unchanged. This would seem to show that if any vapour be given off by sulphuric acid at ordinary temperatures the quantity must be exceedingly small.

One is, therefore, led to think that drying over sulphuric acid cannot possibly be injurious to sensitive plates, and this opinion seems to be confirmed by my own experience of many years just mentioned. There is, however, another possible explanation for the effect mentioned by your correspondent. Sulphuric acid exposed to the air rapidly dilutes itself by absorbing moisture (it may double its volume in a day or two, and continue to absorb moisture for a long time). In this condition it powerfully attracts iron and zinc, evolving hydrogen, and from hydrogen one would readily expect a decomposition and darkening of a sensitive plate exposed to its action. If the sulphuric acid used for drying were spilled over the side of the pan containing it, and reached a nail used in putting together the box, we should have an all-sufficient explanation. Of course I do not pretend to say that in the present case this is the true one, but only that it might easily be. Without very clear proof one could not accept the action of vapour rising from the acid as the cause at work, in the face of so much indication to the contrary.

M. Carey Lea.

NOTES ON PASSING EVENTS.*

By a Peripatetic Photographer.

The well-worn, never-tiresome, and all-important subject of the fading of silver prints has been ably treated during the past month by Mr. John Lamb. This gentleman—whose name I have not previously met with as a writer—treats the question after the manner of one having had large and cultivated experience. I hope we shall hear more from him. Mr. Lamb is quite correct in his surmise that a silver salt is formed in albumenised paper which is not amenable to the solvent powers of hyposulphite of soda. To his inquiry whether this salt may not be albuminate of silver, and his suggestion that a solvent be found for it, I will endeavour to give a reply. Exactly ten years ago this very question was mooted at a meeting of a now defunct society—the North London Photographic Association—and a very decided conclusion was arrived at. It was there demonstrated by Mr. J. Spiller that such a combination as that hinted at by Mr. Lamb really did take place, namely, the formation of an organic compound, which was not removed by hyposulphite of soda, and which more or less rapidly altered by exposure to an impure atmosphere. The test—or, at anyrate, *a* good test—for this organic silver salt is sulphide of ammonium applied to the whites of the picture, by which a yellow stain is immediately produced if the salt be present. Now, from the fact that the ordinary fixing agent—hyposulphite of soda—does not appear to effect the removal of albuminate of silver may be deduced the logical conclusion that the number of silver prints which time and an impure atmosphere will inevitably cause to fade must be "legion." But there is a solvent for this organic salt, and, fortunately, it is one that is very inexpensive, easy of application, and does its work without detracting from the quality of the photograph. This solvent is carbonate of ammonia, and the mode of using it is to mix a little of it with the hyposulphite of soda employed for fixing. Here is a test by which its efficacy may immediately be perceived:—Take two prints from the same batch, and fix one of them in plain hyposulphite solution as usual, but let the other be fixed in hypo. to which has been added carbonate of ammonia as described. After fixing wash both prints thoroughly, and, when dry, apply a brush charged with sulphide of ammonium to the whites of both, noting what takes place; the whites of one will in all probability be found to have assumed a dingy yellow colour, while those of the other remain pure and white.

A patent has been obtained by Mr. Slingsby, of Lincoln, for a studio of a certain form of construction, and I observe that in the very same journal in which is recorded this fact is noted this other fact, viz., that a glass house of a similar form—that is, having a sloping roof and a sloping side—was constructed ten years ago by Mr. A. L. Henderson. Now, as I have some thoughts of altering the lighting of my studio, I am desirous of knowing whether I may follow Henderson's lead of 1866 or am bound to defer to Slingsby's patent of 1876. The conscience of the "Peripatetic Photographer" is exceedingly tender, and he would not like to do anything in the way of overriding a patent but what was both morally and legally right. A little bird has just whispered into my ear that I may use the sloped sides and roof of Messrs. Henderson and Slingsby without saying "by're leave" to either gentlemen, seeing the same construction—that is, a sloping roof and sloping side, both "angled to facilitate the free transmission of light"—was in public use in oriental climes long prior to its adoption by these gentlemen, and a description made public in our own country nearly a dozen years ago.

While referring to the organic acids as applied to sensitive paper I am prompted to inquire if there be no photographer with a little time on his hands who would not "go in" for a course of experiments with the lactate, malate, succinate, benzoate, formiate, and the numerous other organic "ates" of silver? Fame will attach to the man who investigates fully in this direction, and publishes the results honestly, resisting the temptation to glibly enumerate certain preparations which, from a desire to obtain a cheap notoriety thereby, he may say he has tried. To such an one I would say that he will indeed be clever if he can find anything to try not long ago suggested by the late Mr. Burnett, in whose favour there is this to be said—that he actually tried most of the things he "suggested."

I observe that some difficulty or, at any rate, uncertainty as to the best kind of sensitive paper to adopt which will retain its stability during a protracted period appears to prevail among some of the members of the Photographic Society of Great Britain. It is singular that no one thought of suggesting ordinary albumenised paper prepared with chloride of silver in the usual way, and afterwards treated to a liberal dose of citric, tartaric, or similar acids. These will most certainly ensure the preservation of the purity of the paper, and will not interfere to any appreciable extent with its sensitiveness.

Having been trying a variety of experiments with the most rapid dry plates I could obtain, I found that the superior sensitiveness of gelatine over collodion was rendered of less account by the thinness of the image. But I also observed that the intensification of this thin image was a matter of extreme simplicity in comparison with the intensifying, to an equal degree, of collodion negatives. The great secret is to discard altogether the use of the alkaline developer as a means of intensifying, using it only for the purpose of bringing out the detail—no matter in how feeble a manner. Now fix, wash thoroughly, and allow to dry if it be preferred, although there is no necessity for doing so, and then apply the acid pyro. and silver. The intensification will now proceed rapidly to any desired extent; but I advise the use of very weak solutions, for the colour of the image is much more non-actinic than it at first sight appears to be. It is better to proceed gently at first, and dry the negative after it has received a slight degree of intensification. Now try a print, and be guided by the result as to the prudence of further intensification. Let it be borne in mind that gelatine, unlike collodion, holds the atoms of the image under circumstances that bring each atom easily under the influence of an intensifier. When dry, gelatine is exceedingly hard and horny; when wet, it is spongy and absorbent. Collodion, on the other hand, when once dried becomes horny and impenetrable, and remains in that condition; hence the difference of behaviour of the respective negatives under the action of an intensifier.

PROGRESS.

"I don't see the use of all the fuss made about experimenting. It has left *the* process very much as it was given to the world by Archer, and we don't want anything better. What is required in order to make photography all that it should be is a more general study of its art-aspects." Such was the opinion I recently heard expressed by an artist to whom professional photography has brought

* Concluded from page 257.

both fame and fortune; and, as I have reason to believe that the same opinion is held, more or less, by many of whom better things might have been expected, I think a brief glance at a few of the improvements which have been made, and a few suggestions as to what such tentative essays may yet accomplish, may not be unseasonable.

It is not, of course, true that wet collodion, either in substance or in the method of working, is the same now as when first introduced. The difference is as great, in point of fact, as between the delicate negative—soft, yet brilliant, and rich in half-tone and all the good qualities of a high-class photograph—produced at the present day by the few who trust more to their skill as operators than as retouchers, and the hard, dense, patchy images that were the rule when simply iodised collodion and pyrogallic development were in general use. No doubt some good work was done then, but a batch of really suitable pyroxyline was more the result of chance than of intelligent manipulation; and the conditions conducive to tolerably uniform success were so little understood that it was fortunate for professional portraitists that the public were not difficult to please. Any person taking the trouble to examine a dozen of the average portraits of twenty years ago, and comparing them with a like number of average specimens of the present day, will readily assent to the truth of what I say, and as readily acknowledge that, while much has been done by improved methods of lighting, and a great deal by higher aims after, and better ideas of what constitutes, artistic excellence, very much of the improvement is also due to the use of more suitable materials and a better knowledge of how to work them. Now, no doubt, some of this progress has resulted from the ordinary work done in the professional laboratory, but I think it will be generally admitted that much more is due to the painstaking experimentalist, who, without hope of fee or reward, devotes his leisure hours to improve or perfect the art he loves so well.

But, taking the wet collodion process as it exists, is my friend and those who think with him right in supposing there is no room for improvement? or that it is the best for their purpose? I think not. It is true that long practice has given them such facility in manipulation that they can get through their work with a fair amount of ease and certainty; but it has, nevertheless, so many drawbacks—including a granularity in the deposit which becomes painfully evident when used for enlarging—that, aided by the too-little valued experimentalists, I believe the time is not far distant when it will be superseded by dry emulsion plates, which may be prepared at night, or during hours when sitters are not present, and developed by immersion in an alkaline solution contained in a glass tray, or in a bath with parallel sides through which a beam of non-actinic light may be sent, so that the process of development may be observed. It will be remembered that when collodio-bromide was first proposed a theoretical objection was at once brought forward, to the effect that the silver bromide must of necessity be in such a granular state that the production of a delicate image was impossible, and nothing short of ocular demonstration would satisfy the objectors that they were mistaken. The microscope, however, proved such image to be not only finer than anything that could be got with wet collodion, but that it appeared simply as a stain. More recently Mr. M. Carey Lea has ingeniously attempted to account for this by the slower rate at which double decomposition takes place in viscid solutions. It is well known that the more dilute the solutions of any two salts which mutually decompose each other the finer will be any insoluble precipitate that may be formed; and Mr. Lea suggests that viscidity may be supposed to act in the same way as dilution, giving a finer and more sensitive deposit.

I have remarked before, and again repeat the observation, that I believe the acme of perfection in photographic manipulation will be found in the use of an emulsion from which all soluble salts have been removed, which, when dry, shall be as sensitive as ordinary wet collodion, and which may be developed to sufficient density with a simple alkaline solution of pyrogallic acid. Such a reform in the dark room could not fail to gain the attention of even the most conservative of the profession, as not only would much valuable time be saved, but the whole attention could be then bestowed on the "art-aspects" of the business, very much to the benefit of the general work.

Of course before this desirable result can be attained a considerable amount of experimental work has still to be accomplished. Great as has been the progress made in the approach to perfection of the emulsions there are still a few uncertainties to be eliminated and a few improvements required to be made. But the work is in good hands, and I am sanguine that before another season has closed many important improvements shall have been made. As one line of investigation to be pursued I may suggest the reaction of silver nitrate on the organic matter of the collodion. This has already received some attention, but not, I think, all that it deserves. From some experiments recently made, and others still going on, I am under the impression that much advantage may be derived from the prolonged action of the silver on the pyroxyline previous to the introduction of the bromide salt. What may be the nature of that reaction I am not in a position to say, but that it differs with different samples of pyroxyline there is no doubt. That some compound is formed by which reduction is facilitated is evident from the fact that on a number of plates recently prepared and exposed I found the image well defined on removal from the slides, and before development had been attempted. I had previously seen the same thing occur on some of the commercial collodio-bromide plates, but attributed it to the tannin, which I supposed had been added to the emulsion or used as a preservative, although I failed to get the same result from experiments made for the purpose. I may add that plates made with the emulsion treated in the way suggested, although sufficient bromide had been added to decompose the whole of the silver, were very sensitive, and with a moderately-strong developer readily acquired sufficient density.

I think the reform in the dark room here suggested is well worth the attention of both experimentalists and professional photographers. There is a maxim that "practice makes perfect." If the amateur who prepares and developes only a few plates now and then can make really high-class work with the process in its existing state, we are fairly entitled to hope that, improved as it doubtless soon will be, and in the hands of those whose daily avocation it will become it will take its place as *the* process for all ordinary purposes.

JOHN NICOL, Ph.D.

FOREIGN NOTES AND NEWS.

THE ILLUSTRATION IN THE *MITTHEILUNGEN*.—DR. SIMONY'S ADVICE TO LANDSCAPE PHOTOGRAPHERS.—DR. LIESEGANG'S OBSERVATIONS ON THE EFFECTS OF SOAKING CARBON TISSUE IN COLD WATER.

As was to be expected, the fancy ball given a short time ago by the German Crown Prince has given an impetus to the "black art" in the German capital, many, if not all, of the guests wishing to possess a photographic *souvenir* of their costumes at that entertainment. The costumes being all chosen from the same period, and there being only one representative of each character, they blended into a harmonious whole, presenting a harmony usually conspicuous by its absence from similar entertainments, at which every guest dons what seems good in his own eyes in the way of costume, without a thought for what others are to wear, so that Mary Queen of Scots is seen not only in duplicate, but (to coin a word) by the half-dozen-iplicates, and Sir Walter Raleighs by the score. A complete series of portraits of these masqueraders would be interesting, the more so as from their being rigidly tied down to one period it has been possible for the photographers to get furniture and other accessories belonging to the same period as the dress of the sitters. A specimen of how this local colouring can be carried out even to the minutest details is given by the illustration to this month's *Photographische Mittheilungen*, which is a Woodburytype, by Herr Bruckmann, of Munich, from a negative by Herren Loescher and Petsch, the subject being a mediæval free-shooter, with weapons and surroundings in admirable keeping with the dress of the central figure.

In a long paper on the uses made by science of landscape photography, read before the Vienna Photographic Society, Dr. Simony, professor of geography at the university of the same town, made some suggestions to landscape photographers as to how the scientific usefulness of their productions might be increased, of which the three following are worthy of notice:—There is an extraordinary number of good landscape photographs the knowledge of whose very existence is confined to a comparatively limited circle. Many of these are of great interest to the naturalist and to the geographer, and they should be known not only to the advanced students of geography and natural history, but collections of them should be introduced into schools where these subjects are taught. To descend to the elementary branches: every one knows, for instance, that a child will carry away a much better idea of the Taj Mahal or the Niagara if he be shown a picture of them than if his teacher gave him a long verbal description of either the great natural or artistic marvel; and photography, from its general accuracy, recommends itself above all other methods as the vehicle of this idea. So Dr. Simony thinks photographers might push trade and the interests of science—saying one good word for science and two for themselves at the same time—if they persistently distributed catalogues of their works amongst scientific societies, educational societies, and (perhaps if such things were in Germany he would add) local school boards.

Another suggestion is that, as landscapes as well as men change with time, the date of taking the picture should be added to all landscape views, whether cabinet or scrap size.

The third and last suggestion we shall note applies more especially to landscapes taken especially for some scientific purpose, and which are likely to have to be taken again at a future period. It is that the exact spot from whence the view is taken should be indicated so that after a lapse of time it may be found again, not only by the photographer who took the first view, but by a stranger. Thus a series of photographs taken from exactly the same spot, at intervals of say a year, would be useful in showing the change of position undergone by the Alpine glaciers within that time, and also in which years they had moved farthest; but if the standpoint were changed the observers would be reduced to mere guesswork.

In the *Archiv* this month there are two articles from the pen of Dr. Liesegang on various branches of the carbon process. In the latter of these he combats a theory usually applied to practice in manuals treating of the development of carbon prints, namely, that the paper should merely be dipped into water before being laid upon the glass plate, and that it will then lie flat; but that if the gelatine be allowed to become quite sodden with water it will no longer adhere. Dr. Liesegang has found, not theoretically but experimentally, that if paper prepared with soap (?) be used it is not at all necessary to wet it in such a hurried manner; indeed, he has found paper that had been soaking for hours in cold water adhere more firmly than that which had been merely moistened by dipping; on the application, however, of the squeegee the outer edge of the former paper was apt to rise up, but it might be fastened down again quite tightly by laying a weighted glass plate upon it during the few minutes one had to wait before developing. A series of experiments in this direction has convinced him that his slower procedure has several advantages over the usual method. These are:—First, the picture can lie a long time between the printing and developing without growing darker, which it could not do in a dry condition, and by this means it is made possible to get equal work without being obliged to be developing from morning to night; secondly, the paper lies flat, and air-bubbles are almost an impossibility; thirdly, when being developed the paper comes off much more easily, and development proceeds much more quickly; fourthly, the picture film, in backgrounds, for instance, is much smoother and flatter than with quickly-moistened paper, which is often granular. But in order to obtain all these properties it is not at all necessary to leave the paper for hours in water—ten minutes will suffice; only from the foregoing it will be seen that one need not be alarmed for fear of evil consequences should the paper be accidentally left in the water a few minutes longer than usual.

It might be supposed that gelatine in the sodden condition would expand, and that the application of the squeegee might injure the details of the picture. The expansion takes place, but not the consequent injury to the details; at least, in so far as Dr. Liesegang could see under the microscope, there was no distinguishable difference between the sharpness of two pictures, one of which had remained ten seconds and the other four hours in water. In the matter of expansion, on the contrary, he found that the first picture was scarcely, if at all, larger than the negative, while the latter was almost one millimetre in ninety-five millimetres larger than the negative. The length of both pictures (140 millimetres) corresponded exactly with that of the negative, though even a greater difference might have been expected here. The expansion, however, was in the direction in which the squeegee was moved, and might be attributed to its influence. Finally: all the carbon pictures upon glass measured by Dr. Liesegang were in some direction somewhat, though almost imperceptibly, larger than the negative.

It will be no inconsiderable advantage in the way of economy of time and trouble if Dr. Liesegang's observations be confirmed by others, and if it be found possible to develope in the evening, or twice a-day—say at eleven and at five—all the carbon prints printed in the course of the day, collecting them as they are taken out of the pressure-frame in a vessel of cold water.

REMARKS ON MR. H. J. NEWTON'S RECENT LETTER.

THE BRITISH JOURNAL OF PHOTOGRAPHY for May 5th, recently received, contains a communication from Mr. H. J. Newton relative to one previously made by myself. My own communication contained no single word of personality, and I have, therefore, a right to be surprised that Mr. Newton should go to the extremest length in the opposite direction. Of this part of Mr. Newton's letter I shall take no farther notice than to say that Mr. Newton forgets what is due to me and to himself in so speaking.

As to argument, the letter contains but little. Mr. Newton affirms that when he published his process on May 4th, 1875, he had not read my communication of March 12th of the same year, and takes very much space to endeavour to prove that he had not seen it. This might have been a good defence against a charge of intentional plagiarism had such a charge been brought; but it was not, and I had made it very clear that no such charge was intended. In fact, my reclamation was written with an amount of consideration for Mr. Newton that makes the tone of his answer most extraordinary. The question was simply one of priority, and as arguments on a question of priority Mr. Newton's can only provoke a smile. The same may be said of his averment that my description of the process was headed with "small capitals" only. Does he imagine that the force of the argument depends upon the size of the type?

In Mr. Newton's long letter he has scarcely touched upon the real point at issue. This is—Is not my process of March 12th essentially the same as his of May 4th? Most undoubtedly it is. My process is based on the idea that *an emulsion might be made to keep by adding to it a sufficient quantity of soluble chloride to remove the excess of silver nitrate.* Mr. Newton can neither deny (nor does he) that this is the cardinal point in my process, as it also is in his.

There is a singular sort of affected misunderstanding as to what I said about excess of silver nitrate that I do not find it easy to understand. What I wrote was very plain. The quantity of silver nitrate was to be a little short of that required to decompose all the haloids. But as the chloride was only added at a later stage there was, in the meantime, an excess of silver nitrate. I, therefore, said:—"With this emulsion the addition of the cupric chloride after the silver nitrate has this farther advantage—that the emulsion is thus left for a time in the presence of excess of soluble silver salt, which is favourable for sensitiveness."

This is a complete anticipation of Mr. Newton's subsequently-published process. The conception is identical in both: the production of an emulsion containing, at first, silver nitrate in excess and the subsequent removal of this excess by a soluble chloride, in order to obtain better keeping qualities—a result which, I may say in passing, is only partially obtained. The only essential difference between Mr. Newton's method and my own is that mine was published about two months earlier.

I feel as if I had already taken up too much time and space in relation to what is, at best, but a second-rate method of operating. It is of the least possible importance to me whether a process devised by myself, but presently discarded in favour of a far better, should be ascribed to Mr. Newton or to myself. There remains, however, one point which, though almost beneath my notice, I feel that I cannot wholly pass over. Mr. Newton seems to desire to raise a question of veracity in connection with a reference which I made to a note-book. It happens that my note-books are kept in a very orderly and consecutive manner, so that a mere inspection is sufficient to afford proof as to what was, and what was not, noted down at the time of executing the work. Mr. John C. Browne, a distinguished member of the Philadelphia Photographic Society, has been kind enough, at my request, to read those parts of my note-book which relate to the process in question, and to him I refer Mr. Newton. I trust that I am justified in believing that no one else would require such a proof at my hands. M. CAREY LEA.

Our Editorial Table.

THE AUTOTYPE PROCESS. Fifth Edition. By J. R. SAWYER.
London: THE AUTOTYPE COMPANY.

IT is a healthy sign when another edition—this time the *fifth*—of this popular and practical manual of carbon printing is called for by the public. It indicates mobility in the process—a sure indication of salutary progress. The new edition bears the name of Mr. J. R. Sawyer as its editor, the work having been revised and partly rewritten by that gentleman. Two entirely new chapters have been added, one being *On the Adaptations of the Autotype Processes to Various Materials*, and the other *On Failures and their Remedies.* An improvement has also been introduced as respects the various formulæ required in carbon printing, these being now tabulated in two pages at the end of the work in the manner so well known to readers of THE BRITISH JOURNAL PHOTOGRAPHIC ALMANAC.

There is one department in photography in which the carbon process is specially valuable, namely, for the production of photographs on ivory

as a basis for miniature painting. It is, of course, very sad when photographs of any kind fade and become of a sickly yellow hue—a hue pervading both lights and shadows; but it becomes a more serious matter, in many respects, when upon such a photograph containing the seeds of decay an amount of ten, twenty, or forty guineas has been expended to ensure its being sumptuously coloured and with artistic skill. That many ivory miniatures have faded miserably is a fact only too patent; and it is to the credit of several high-class, conscientious artists that they have declined to jeopardise their reputation and injure their *clientèle* by painting upon a silver basis.

The method of producing a carbon print upon ivory is so easy as to leave without excuse any photographer from whom such work is demanded. From the *Manual* before us we find that only one caution is requisite—the double transfer process should be employed instead of the single method, as any attempt to develope the picture direct on the ivory will so stain the *matériel* with the free bichromate left in the pigment paper as to render the ivory utterly useless. The development must be effected on a "flexible support;" and a piece of ivory of the proper size having been provided, and its surface rendered perfectly clean, the two—that is, the picture and the ivory—are immersed face to face in a solution of gelatine containing chrome alum, and after being pressed into contact they are allowed to become dry, when the temporary support will peel away with the greatest ease, leaving the picture on the ivory in a perfect condition for working in monochrome or colour.

On the subject of the alleged fading and deterioration of pigment prints it was not to be expected that a new work on "autotype" would be entirely silent. We select for reproduction some very sensible remarks on this subject:—

"Pigment pictures are supposed to be permanent, and they are undoubtedly as permanent as the pigments used; so long as the latter belong to the class of known permanent pigments, and the prints themselves are properly freed from the excess of bichromate salts, pigment pictures are as permanent as paintings, engravings, water colours, and any other artistic work. Very excellent colours —black, brown, sepia, red, blue, &c.—can be had in pigmented tissues. But should the public taste call for an exaggerated brilliancy—which at present can only be produced by means of cochineal colour—then exposure to light may effect a change and deterioration; but even then there will be no disappearance of the picture. It may not retain the pristine brilliancy that characterised its first production, but it will never fade out; the basis will always be permanent, and there will never be annihilation.

"All the range of photographic tints produced by gold toning can be obtained in pigment prints, and of undoubted permanency; if more than these are required it may involve some slight loss of that permanent quality which is the very essence of pigment printing.

"It is well known that painters—especially in water colours—employ the lakes (which are not absolutely permanent, being made from cochineal) in their works; but nobody thinks of submitting a delicate and costly water colour to the action of sunlight or even of the atmosphere. It is carefully framed and glazed or kept in a portfolio. There is no reason why good photographs should not receive equal consideration, and achieve equal, if not greater, permanency.

"The very fact of the pigment being locked up in the insoluble gelatine is in itself a very great aid to permanency. It is believed that all the pigments employed by artists, if they do not act upon or decompose the gelatine, may be employed in the manufacture of tissue; and the result will be as satisfactory as regards permanency as that of any artistic work in water colour.

"The main cause of fading or deterioration is not the colour at all, but the failure in getting entirely rid of the surplus bichromate salt. The picture must be immersed in alum—which should not be weaker than one part of alum to thirty of water—and it should there remain till all yellow colour has entirely disappeared. This is very easy to effect in double transfer from rigid surfaces and from collodionised glass. A little more care is required with the flexible support, and still greater watchfulness with single transfer prints; the latter being mounted at once on the paper upon which they are destined to remain, the bichromate gets into the paper and stains it a yellow colour. If this be not perfectly got rid of by the action of the warm water used in development, followed by the alum bath, the picture cannot be considered permanent, but will gradually lose its original colour and become of a sickly greenish-yellow in the lights.

"Fortunately the yellow colour is so apparent that its perfect elimination is easily seen; and it is not too much to say that, by the processes described in this manual, photographs that will last as long as the material upon which they are made may be produced, to suit many different purposes and to meet a variety of needs, with comparative ease and certainty."

There is so much valuable matter in this edition that we can very strongly recommend it to every reader who desires to become acquainted with pigment printing, to which it is sure to give a further impetus.

LEAVES FROM MY AUTOBIOGRAPHY. By CHARLES ROGERS, LL.D. London: LONGMANS & CO.

THE tourist who, when journeying northward, passes Stirling has his attention irresistibly attracted to a massive baronial tower which crowns an eminence in that vicinity. This eminence is the celebrated Abbey Craig, famous in Scottish history, and the tower is the Wallace Monument. Dr. Rogers was prime mover in the erection of this national monument to a patriot whose name lives in every home "ayont the Tweed," and the course of connection between the projector of the monument and the tower itself, like that of "true love," was far from being "smooth." The *Leaves from My Autobiography* are presented to the public with the view of explaining details of opposition encountered in bringing to completion the creditable and patriotic work our author set himself to accomplish, and we commend the volume to all interested, but especially to our friends in the north.

Dr. Rogers is a powerful "word painter," and many passages in his work display his facility as a descriptive writer. The following, for example, would almost make an enthusiastic photographer rush to the spot, camera in hand, to carry away with him pictorial transcripts of so charming a spot:—

"Abbey Craig, on which the Wallace Monument stands, is a wooded eminence in the vale of Stirling, presenting a bold and precipitous front towards the south-west. Around is a scene of picturesque beauty and ennobling association. A fertile valley is guarded on the north and south by undulating hill-ridges and pastoral slopes, and bounded on the distant west by the great mountains of Ben Lomond and Ben Ledi. In the union of hill and dale, wood and water, ancient ruin and modern villa, generous culture and picturesque sterility, the scene beneath is singularly enchanting. On the sloping base of the Ochils is Airthrey Castle, with its fine park and lake, Bridge of Allan nestling under its wooded heights, and 'the lofty brow of ancient Keir,' celebrated by a poet as the most poetical of Scottish country-seats. On a peninsula, formed by the windings of the Forth, stands the hoary tower of Cambuskenneth, rejoicing in its seven centuries of age. Southward are the plains of Bannockburn and the Rock of Stirling, crowned by its historic fortress. In this locality Scottish liberties were maintained on many a bloody field."

The work is illustrated by a portrait of the author, and by two other Woodburytypes, executed by Messrs. Taylor Brothers, Fox and Co.

Meetings of Societies.

VIENNA PHOTOGRAPHIC SOCIETY.

AN ordinary meeting of this Society was held on the 4th of April last,—Dr. Hornig in the chair.

The minutes of the last meeting having been held as read, and a new member admitted, the President read several notices and laid on the table seven sheets of pictures of plants presented by Herr Antoine to the Society's "wander album;" after which,

Dr. SIMONY, Professor of Geography at the University of Vienna, read a long paper on *Landscape Photography as it is Turned to Account for Scientific Purposes.* In the course of his remarks he (Dr. Simony) readily admitted the important services rendered to many branches of science—for example, to the geographer and the naturalist—by the accuracy and rapidity with which photography seizes its impressions; but he had many suggestions to offer to landscape photographers which, if put in practice, would materially enhance the value of their views as mediums of scientific research.

At the conclusion of the paper, which was listened to with the greatest attention, the President laid on the table three negatives which Mr. Warnerke had sent to Herr Moll along with a block of the same negative paper as that from which the negatives in question had been prepared. Herr Haack was requested to experiment with some of the paper and to report results at the following meeting.

Copies of the *Aide Mémoire de Photographie* and the *Agenda Photographique*, presented by their respective editors, were then laid upon the table, the President remarking that these annuals did not flourish so well in Germany as in France and England, and that possibly their comparative non-success might be partly attributed to the cost not being defrayed in anything like the same degree as those of their foreign brethren by the advertisement pages.

Herr Czihak then showed how his revolving stereoscope worked. It is contrived so that the separate pictures are all fastened together by threads or tapes, like the cards of a Jacquard loom, and the chain so formed is laid round a four-sided prism made of plates of glass, which turns upon a horizontal axis. By inclining the prism to an angle of 90° a new picture is always brought in front of the lenses. When the pictures are transparencies the glass must be fastened between two pieces of card having a hole cut in the middle to show the picture, the ends of the cards being fastened by tapes as before. The advantage of this apparatus is that a great number of pictures can be arranged so as to occupy a very small bulk.

Some plates coated with Herr Wehl's varnish, mentioned some time ago, were then shown, but gave rise to no further remark than the very obvious one that it is impossible to judge of the durability of a varnish until the plate coated with it has undergone a considerable amount of wear and tear in being printed from.

Herr Riewel showed two carbon prints upon glass from the same negative. One of the prints presented a peculiar granular appearance,

guesses at the origin of which granularity gave rise to a very lively discussion, in the course of which Herr Eppel remarked that perhaps the paper had been too soon removed.

Herr Angerer suggested the possibility of the action of the bichromate with which the paper was sensitised not being uniform.

Dr. Székely was inclined to suspect that some of the alum had been precipitated as crystals.

Herr Riewel said the fault had been observed before immersion in the alum bath.

Herr Jenik had observed this peculiarity in Spencer, Sawyer, Bird and Co.'s paper.

Dr. Székely thought that in certain circumstances the gelatine might be to blame.

Herr Luckhardt remarked that the paper might have been stained with damp (mildewed), and recommended a microscopic examination.

Herr Haack suggested that the developing water might have been too hot, so as to render the gelatine granular and difficult of solution.

When all these gentlemen had "said their say,"

Dr. Hornig (President) closed the discussion with a few sensible remarks, the gist of which were that as, even now, photographers of great experience in the silver process are continually meeting with faults and have difficulties to contend against, and as the carbon process is comparatively new and those who work it inexperienced, they cannot expect to become expert all at once in the new process; nor must they be disheartened by the difficulties they meet with, but by patient study and persevering practice attack the difficulties as they did those of the older process when learning it, and, like those others, many or most will disappear with time.

At a former meeting the cause and the best way of removing certain surface stains from negatives were discussed at length, but, as there appeared to be considerable misconception on the part of some of those who took part in the discussion as to what stains were referred to, Herr Riewel exhibited a negative in which this appearance was very distinct, and another very animated discussion followed. Among the speakers,

Herr Tschopp said he had already observed that appearance in the more sunken parts of negatives, but thought that the deposit, whatever it was, adhered very loosely and could easily be removed with a brush.

Dr. Székely did not recommend that procedure, as it might injure the negative.

Herr Bachrich thought that these stains were most likely to appear if the plate were not allowed to drip properly.

Herr Eppel believed it was caused by collodion which did not contain enough water.

Herr Byersdorff had met with them both in well-drained plates and in those coated in a fresh silver bath.

Herr Bachrich remarked that the appearance might be seen on all sorts of plates.

Herr Remelé said that when the places where those surface stains appear could be recognised before developing there was usually some organic matter present in the form of dust, which occasioned a reduction in its immediate neighbourhood, and which ultimately spreads.

Herr Ungar stated that he had frequently observed these stains when the pyroxyline used gave a horny collodion.

The meeting was shortly after adjourned.

Correspondence.

June Meeting of the Photographic Society of France: Honourable Place for Photography in the next Universal Exhibition of Paris (1878); Photography in the Streets of Paris; Fatty-Ink Proofs from the Autotype Company and Others; Improvement in Fatty-Ink Printing by M. Léon Vidal.—The Photographic Exhibition a Commercial Success.—Presentation of Mr. Crookes' Radiometer to the Society.—Experiments on the Manufacture of Nitrate of Silver.

The Photographic Society of France held its monthly meeting on Friday last, the 2nd instant,—M. Peligot in the chair.

After different presentations a discussion took place as to the manner in which photographic art should be represented in the forthcoming exhibition of 1878—in fact, whether photography should be looked upon as an art and classed as such, or its products placed amongst miscellaneous objects. It appears that the commission has already classed it with divers objects quite foreign to its pictorial merits. Great praise is due to the Photographic Society of France for its unceasing exertions to do honour to photography and for the spirited way in which it protested against any infringement of its rights. Nor are they alone in the world; a syndicate has been formed to decide questions arising between photographers and the public, and it is very seldom that one or the other of the contending parties do not accept their arbitration.

The subject of the annoyance to which photographers are exposed who wish to take views in the interior of Paris was now brought before the Society. Photographers complain that they are exposed to administrative rules and regulations which cause them to lose much time; they can only obtain permission to set up their camera in Paris for the following day, and very frequently the morrow turns out wet and cloudy, and so, they say, it is necessary to obtain another permission, and much valuable time is thus lost. A *pro* and *con* may be mentioned: for photographers it is indeed a loss of time and money; but to the public it is also very annoying to have the thoroughfares obstructed by a great number of idle, ignorant loungers surrounding a photographic apparatus, looking with wonder and amazement at an instrument which they cannot understand. I well remember that, immediately after the Commune, it was nearly impossible to walk in the streets without meeting several of these strolling artists bearing cameras of every size and fashion, each having his crowd of admirers, which he had much trouble to keep in a crescent form about his apparatus, and the police officers from becoming distracted at the resistance they experienced in clearing the way. This abuse of freedom gave rise to a general order prohibiting photography in the streets without a special permission. I am certain that before that period no photographer was molested, as I myself have very frequently taken views in the public streets without the least hindrance on the part of the police; on the contrary, I was rather protected than otherwise. Let us hope that the Society will be able to succeed in arranging this matter to the satisfaction of all concerned.

The Autotype Company sent a fine collection of fatty-ink proofs for nspection; indeed, the greater part of the evening was taken up in viewing collotypic proofs forwarded from different persons for this purpose.

M. Léon Vidal made a very interesting communication to the Society upon an improvement which he had lately made in fatty-ink printing. By this improvement collotypic printers can employ the pellicle of bichromated gelatine not only to print helio. proofs, but as a substitute for the lithographic stone; in other words, an explanation of the print can now be written under the proof and printed off at the same time without difficulty. Fine etching can be done round the portrait or proof in the form of an artistic frame, &c.; in fact, M. Vidal tells us that retouching is no longer a difficulty. Hoping that it may be of service to the readers of The British Journal of Photography I will give in full the interesting communication of that gentleman:—

"At the moment when the magnificent exhibition of photography organised by the Photographic Society of France proves beyond doubt that a very great progress has been accomplished in collotypic printing, anything which may simplify that process would be acceptable. For this reason I come forward hoping to render service to many in describing a simple means of retouching gelatine films from which photographic proofs are to be printed in fatty ink.

"Those who devote themselves to fatty-ink printing from bichromated gelatine generally employ patent plate-glass, and when the proof is obtained they do not modify it, so that if the image require a frame a second operation is necessary in order to obtain it. The same operation is required if a signature or a description, &c., is to be printed at the bottom of the page. It is very often necessary to retouch the gelatine film in certain parts where details are absent, and in others where white spots become visible.

"I have succeeded in attaining this object by the employment of a chemical agent, having the same peculiarity as light, in the insolubilisation of that organic matter in presence of a chromic salt. Gallo-tannic acid secured the desired result, and even common ink containing a small quantity of tannin will answer after isolation, and, even after the necessary washing, any design can be drawn upon the film. A signature or anything else can be written and printed off without trouble.

"The surface of the glass is so flat and even that the most delicate design can be drawn upon it. This will be found of great value for the decoration of proofs having frames drawn with the drawing-pen around them. Typographic transfers can be obtained as easily as upon stone, by employing a thin ink containing tannin.

"There are many other cases in which this complementary means of printing from gelatine can render service, and each person will employ it according to his wants. It is, therefore, useless to name all the different cases in which it is useful; suffice it to say that for many uses it will replace advantageously the lithographic stone.

"To sum up: this process will enable the operator to draw from a bichromated gelatine film either a view, portrait, photographic proof,

or a drawing, lineal design, signature, &c.—in fact, all that can be obtained from a lithographic stone, and, what is more, both can be obtained at the same time.

"Ordinary ink suffices to prove the truth of this assertion, but a series of bottles containing tannin or gallic acid in different degrees of concentration is necessary to obtain different tints—from jet black to light grey."

In a future communication I shall have the honour to lay before the Photographic Society of France a collection of proofs printed after M. Vidal's system. I can obtain from twenty to twenty-five proofs per minute.

Yesterday I visited the Photographic Exhibition, and had the pleasure to assist at a public demonstration to test the facility of manipulation of M. Léon Vidal's new idea. Around a photographic proof on bichromatised gelatine different verses, a signature, &c., had been written. The inking roller was then passed over, the impression taken, and a fine proof in fatty ink was produced with all the writing perfectly visible, and in different shades according to the ink employed. Naturally, the writing was reversed. I hope this improvement will be of service to many, as there is no restriction put upon its employment. M. Vidal was congratulated by his audience, among whom were many of the foremost men connected with the photographic art. As for the Exhibition, it is very successful, and great numbers visit it. The chief attraction is the projection of a voyage round the world, &c. In fact, the general public begin to appreciate photographic exhibitions more and more every year.

The members of the Photographic Society of France were very much interested on Friday evening by the presentation of the "*radiometre*" of Mr. W. Crookes. Although this little instrument has been the subject of much controversy for the last two years or so in England and in Germany, still it is very little known in France at the present day. The radiometer presented to the Society was of an egg-like form, made of blown glass. In the centre was a pedestal of the same substance reaching half-way up the egg. Another pedestal descended from the top and met the lower one to within about an eighth of an inch. The two ends of the pedestals were hollow for about a quarter of an inch. The pedestals were employed—the lower one to support and the upper one to hold a steel axis, to which was attached a kind of windmill sail made of four pieces of very thin mica a quarter of an inch square and of exactly the same weight. One side of the mica was painted black and the other silvered. This kind of four-sail mill was in perfect equilibrium between the two pedestals or pillars. A vacuum is thus obtained, and if the apparatus be placed in sunlight it will turn on its axis with astonishing rapidity; if put in the shade it will turn slowly, and so on in proportion to the strength of the light.

It might be supposed that the great stumbling-block to photographers was now removed, that the actinic power of light could now be measured with precision, and that they would now be enabled to expose their models the exact length of time at any hour of the day without error. Alas! it was soon found out that not only light but heat had an influence upon this instrument; nevertheless, I am of opinion that with a little common sense and a few experiments the instrument, even as it is, could render much service to the profession. A star could be painted upon one of its sails, and the apparatus be fixed in a corner of the studio. If only four observations were made daily of the number of rotations per minute at a certain hour, the temperature, with the time required for exposure of the plate employed—if all this were noted down for a short time and the results given to the public the value of the instrument would soon become apparent, and a table could then be drawn up for the time of exposure required at a certain temperature, the instrument giving so many revolutions per minute.

The other day I made several experiments as to the best means of making nitrate of silver from an alloy of silver and copper. Having a quantity of plate a little the worse for wear and tear I determined to make a trial as to the best means to convert it into nitrate without the risk of having nitrite in that salt.

I dissolved twelve ounces of metal in pure nitric acid containing half its weight of distilled water. The evaporation was continued to dryness without any crystallisation, and the product was fused until the nitrate of copper was decomposed. Distilled water was added; the solution, when filtered, gave no trace of copper whatever. When analysed it was found to contain a great quantity of nitrite of silver in solution. To transform this nitrite into nitrate I evaporated nearly to dryness, then added a small quantity of nitric acid, fused the product for an instant, added distilled water when cold, tested with blue litmus-paper, which turned of a pale red colour after a certain time, and allowed the solution to crystallise. A bath made of this salt works admirably.

Ten ounces of metal were dissolved in nitric acid. A tenth part of the solution was put into a bottle and a solution of pure potash poured in, little by little, until the brown-black precipitate of oxide of silver ceased to fall. This was now well washed to free it from potash and the nitrate of potash, and when all alkalinity had been removed it was washed for the last time in distilled water. During these manipulations the remainder of the solution of nitrate of silver had been evaporated to dryness; it was tested and found to be neutral. Distilled water was added, together with a certain quantity of the oxide of silver and copper which had been formed apart. The solution was maintained at boiling point, the nitrate of copper was decomposed, and the oxide of copper precipitated in forming nitrate of silver. It is very easy to ascertain if the operations have been successful in filtering a few drops into a small quantity of distilled water and adding a drop or two of ammonia. If the liquid remain transparent it is finished; if a bluish colour appear more of the oxide must be added. The solution was filtered and crystallised and gave a very good result.

Ten ounces of metal were dissolved in nitric acid and precipitated into chloride. This was well washed, to free it from the nitrate of copper in solution, and dried. One hundred grammes of chloride of silver, seventy grammes of chalk or whiting, and four grammes of pulverised charcoal were added. This mixture was put into a crucible and then introduced into a gas furnance; in an hour a beautiful ingot was ready to be dissolved in nitric acid, the product of which was then evaporated to dryness. Distilled water was now added, proper acidity was given by means of a drop or two of nitric acid, and the solution was left to crystallise. This method, although the most expensive, gave the best results. E. Stebbing, *Prof.*

3, *Place Bréda, Paris, June* 5, 1876.

INVENTION IN DEVELOPERS.

To the Editors.

Gentlemen,—Before I published the fact of the best development for dry plates being an alkaline developer of very great strength no one dreamt of using one.

So far from its suiting *my* plates only Mr. R. M. Gordon adopted it for gum-gallic; and in your issue of January 24th, 1873, you will find his words as follow:—"I feel sure your method of developing dry plates with a very powerful developer will be found to be one of the most important novelties introduced into photography of late years, and is, in my opinion, even more valuable in bath than in emulsion work." Captain Abney adopted it for beer and albumen, Mr. Warnerke for his tissue, and numerous workers for coffee and other bath plates.

You say it does not answer for Kennett and Liverpool and Russell plates so well as the formulæ recommended by their manufacturers. I do not profess to publish formulæ for developers suitable for *secret* processes, but only for those of which the formulæ are known and published, and can therefore be discussed.

I find from your append that the developer spoken of by Mr. Berkeley as "Franklin's" is an exact copy of one published in your columns by me.—I am, yours, &c., H. Stuart Wortley.

Rosslyn House, Grove End-road, N. W.,
June 6, 1876.

[Notwithstanding the above, historical justice demands that we reiterate the fact that the advantages occasionally arising from the use of strong developers were recognised more than twenty-two years ago; and publication was at that time made of formulæ in which the strength of the developer was more than doubled. In the application of this strengthening principle to the developer for his uranium plates we are unable to discover in the production of the formula in which Colonel Wortley evidently feels a strong paternal pride anything beyond the mere modification, for a certain purpose, of a developer that every manufacturer of sensitive plates, as well as the great majority of intelligent photographers, invariably modify to suit special requirements.—Eds.]

THE "PERIPATETIC PHOTOGRAPHER" AND AUTOTYPE PUFFERY.

To the Editors.

Gentlemen,—Your correspondent, in discharging his bolt last week against the paper on *Carbon Transparencies* read before the South London Photographic Society by Mr. W. T. Wilkinson, and exposing the absurd issue of the discussion, does a service to photographic literature and deserves complimentary thanks.

Any elucidation of the scientific aspects of the black art, any contribution of details and processes, any improvements in mechanical appliances, are, of course, fit subjects for discussion among the members; but the ventilation of a secret nostrum or advertising a trade interest is simply derogatory.

I can only say, on behalf of the Autotype Company, that the action of Mr. Wilkinson was entirely spontaneous, and in the exercise of his discretion as an individual and a member of the South London Photographic Society. "Save us from our friends!" Mr. Foxlee was forced on his legs by a direct appeal from a member of the Society, and, no doubt, wished himself elsewhere, appreciating clearly enough the false position in which both the Society and the Autotype Company were being placed.

Mr. Wilkinson is well known as an ingenious photographer, and has the interest of the South London Photographic Society too much at heart to be suspected of any willing offence against literary decorum, and any trifling error of judgment will be readily condoned. He is also far too sensible a man to need the admonition that the Autotype Company prefers to blow it its own trumpet if advertising music be needed.—I am, yours, &c., W. S. Bird.

June 6, 1876.

[It is due to Mr. Wilkinson to say that his paper was written by request of the members; that certain remarks that have been animadverted upon were made, and intended to be received, in a humorous spirit; and, finally, that the paper elicited one of the most genial conversational discussions to which we have ever listened. With this all further reference to the matter may fitly terminate.—Eds.]

OXYHYDROGEN.

To the Editors.

Gentlemen,—I shall be obliged if you will kindly publish the enclosed letter addressed to me by Mr. D. Young.—I am, yours, &c.,

Clifton Bank, Wellington Road, Whalley Range, Manchester, June 4, 1876. C. Adin.

"*Swinton, May* 27, 1876.

"Dear Sir,—I notice in your report of the last meeting of the Manchester Photographic Society you say, 'Mr. Young showed a *large retort* and gas jets capable of supplying *ten* limes in work at one time. Mr. Lever claimed to have made a similar article fifteen years since.'

"You have quite misunderstood what Mr. Lever said. What he claimed to have had in his possession fifteen years was a *three-ways tap* similar to the one attached to the oxygen generator I showed, and not the generator, as you put. Again: I think you can scarcely call it a 'large retort' when the whole apparatus can be carried in the pocket, and you saw me produce this from mine. I said *eight* lime lights. This, however, is of no consequence, as I had left a margin; but the other is, and I am sure your love of fair play will cause you to have it corrected in next week's Journal.—I am yours, &c.,

"Chas. Adin, Esq." "David Young.

REPLY TO THE "PERIPATETIC PHOTOGRAPHER."

"Thou comest in such questionable shape that I will speak to you."

To the Editors.

Gentlemen,—On page 209 of your issue of May 5th your correspondent signing "Peripatetic Photographer" is thrown into a state of wonder from what Dr. Nicol had said about my invention in a previous number of The British Journal of Photography. As the "Peripatetic Photographer" gives no name by which "P. P.'s" gender can be known, I will take the medium course and call the "Peripatetic Photographer" it.

What seems to trouble the "Peripatetic Photographer" most is my legal right to patent the invention bearing my name. An invention, then, is either an easier way of doing an old thing or the accomplishment of a hitherto unknown result—a simplification of means or an increase of power. The person who has the knowledge first is the first inventor, and if he wish to retain a part of the benefit to himself he may, by giving the necessary form and paying certain fees, get the law to protect him for fourteen years, so that after that time society may be permanently benefited. But when a man swears that he is the only and true inventor, this can only be taken in a comparative sense, for the invention may be due to the size or condition of the brain, or it may be due to a combination of brain, school, or other experiences, none of which can be absolutely claimed as the individual's own, as he is indebted to his parents for not only his brain but for his whole bodily structure. Even this is only an "alleged fact," as the elements of man's physical structure are continually changing; and, therefore, a patent granted one day could not be legally defended on the succeeding one. A theist applying for a patent could not swear in an absolute sense that he was the first and true inventor, as he would believe that the Creator and Governor of the universe had been aware of it ages before he was born; while an atheist would say that it was due to the inherent power of matter. Man can claim anything only in a comparative sense.

I claim to be the first and true inventor in the sense that I was the first person on this earth that had a knowledge of producing the results by these arrangements. Whether it was from information I received from school or college, from the spiritual world, personal observation, reflection, or from the qualities of the whole or some particular parts of the brain, is a matter of indifference, because my patent would be void if the same results had been produced publicly by the same arrangements before I obtained it. A patent is granted to the person who publishes the knowledge first, and is legally protected until some other person comes forward and proves that a patentee stole the knowledge from him; so, therefore, "P. P." may keep itself quite easy about my moral right to patent my invention. I have no desire to curb "P. P.'s" imagination in the least; it may indulge itself to any extent in picturing scenes between judges, lawyers, and myself in patent lawsuits. Having solved the problem of man's immortality and got rid of the fear of death, such boo-boo scenes may frighten persons in an infantile condition of mind, but for me they have no terror. If I can obtain the favourable verdict of the judge who sits within—

"What to me is the scorn of the foolish and vain?
I have borne it before, and can bear it again."

"P. P." says it knew all about it langsyne; may I ask how it used that knowledge, for knowledge has its duties as well as its privileges?

During the time I was making the necessary experiments two of my little daughters died—one of them of lingering disease. We had to wait on her day and night for about five months, I sitting till three in the morning, my wife at that hour taking my place. Sometimes we were at a loss to know where we could get funds to procure the elements of physical existence; for, although there seems—at least here—an inexhaustible fund of charity for our "black brudder" abroad, there is all manner of uncharitableness for any white one at home who may dare to exercise the Protestant right of private judgment in religion. Not content with the amount of persecution they can inflict in time, they have, like "P. P.," a vivid imagination, and can picture with intense joy the very warm reward I will receive in the world beyond.

Two gentlemen lent me the means to enable me to complete my experiments and patent my invention. May I ask what assistance "P. P." rendered me either in material means or kindly sympathy? It seems to me it hath used its "knowledge" to hide itself in ambush and pounce out upon me, to steal not only my goods but my good name. Thus some people would try, by ridicule (which is a powerful weapon with the unreflecting) and misrepresentation, to prevent those who would study spirit intercourse, or, failing in that, would rob them of the gifts that spirit friends have to bestow. I have had almost daily intercourse with friends in the spirit world since November, 1864, but during all that time I have never received such a "low manifestation" as that from "P. P." on May 5th, 1876, through the mediumship of The British Journal of Photography.

That I am a poor man nobody can regret more than I do myself. It would have given me great pleasure to have been able to give the invention to my fellow-creatures without asking any return. Would "P. P." advise me to charge a little to each individual that would be benefited by the invention, and thus enable me to fulfil my duties to my family and those kind friends who assisted me? or would it prefer that I should learn the usual statutory oath and thus deceive those who trusted me? If "P. P." be removed above these low considerations, may I have the temerity to suggest that, instead of keeping my specification before it, it would leave it behind, seeing that the playful exercise of "P. P.'s" profound imagination can easily invent something of more importance to photographers?—I am, yours, &c.,

Hamilton, June 1, 1876. William Birrell.

[Our correspondent has not quite correctly read what was written by the "Peripatetic Photographer," as that nomadic personage does not say, as stated by Mr. Birrell, that *he* "knew all about it (the invention) langsyne," but that the fact of its having been alleged to be a spiritual communication "has been well known to many others than Dr. Nicol langsyne;" and this, we imagine, will scarcely be gainsaid, for we, among others, had for some time been aware of it. —Eds.]

NOTES ON EMULSIONS.

To the Editors.

Gentlemen,—My continued experiments go still further to prove that excess of silver is not necessary for sensitiveness. I have stated that I kept some of the C gum emulsion for a week, silver being in excess. At the end of that time one ounce had fifteen grains of gelatine added to it, and the other the same, except that the excess of silver was converted by half-a-grain of ammonium bromide, this being added about two hours before dissolving the gelatine. Free soluble haloids were proved to be then in excess.

Four plates were exposed—a "Kennett" plate, made with ale and water equal parts (I regret to say that the pellicle which had been kept in a bottle had decomposed through damp), a C emulsion plate, and plates by the above emulsions, which I shall call "C 2" and "C 3."

"Franklin's" developer was used. The "Kennett" plate wrinkled entirely on wetting, and I got the least detail out of it of the four plates. The colour, so far as I could judge, seemed to incline to the brown tint of all the plates developed with carbonate. When wrinkling happens in this way on wetting I consider it is a certain case of "decomposition proper."

The C plate, as usual, inclined to fog with this developer. The C 2 plate (silver in excess) for a week developed cleaner, but I fancy with less detail; so that the continued action of silver does not conduce to sensitiveness, but it appears that it does to clearness. It has, however, only just struck me that it is possible that the fog of the C plates may be caused by a slight discoloration at one spot I noticed some time after I had added a little of a decoction of cloves to the washing-water; all the free silver could not have been washed away, as I supposed to be the case. It is well to mention this.

The C 3 plate—this is my "farther proof"—that with excess of silver as the last, converted by soluble haloid, developed very cleanly, and, what is more, showed more detail than any of the plates. There seemed no disposition to undue density.

In order to illustrate the peculiarities of blistering or wrinkling I will remark that the C 2 and the C 3 plates wrinkled on developing, not on wetting, as the "Kennett" plate did. The C plate wrinkled on washing off the developer. Thus wrinkling may happen at three distinct stages of development—"three degrees of comparison." I suppose that the later a plate wrinkles the less decomposed the gelatine is.

It will thus be seen that, as I have stated to be the case with collodion emulsion, the free silver nitrate can be converted by excess of soluble haloid without lessening the sensitiveness of the emulsion, especially if this excess be washed out. As a corollary, it follows that free silver nitrate affects only the organic constituents of an emulsion.

In practice I think it will be found that it is only necessary that the excess of silver act on the organic constituents for a while, and then be converted by soluble bromide.

There is one point in the making of emulsions which I do not remember having seen remarked upon; in fact, the thing seems to be done without any apparent motive—at least I believe a reason has not been stated. I refer to the making of an emulsion with the silver in excess the greater part or the whole of the time of adding the soluble bromide. Some have adopted this method, even with gelatine emulsion, when there is no pyroxyline to act upon. The usual method is to add the silver nitrate to the bromide.

Now, supposing the same quantity of salts were used in sensitising in each case, would there be any apparent difference in an emulsion the silver bromide of which has been precipitated with the silver in excess during the whole time of sensitising, or adding the soluble bromide from another the silver bromide of which has been precipitated with soluble bromide in excess, the excess of silver being only added at the end of the operation? The same question applies equally to emulsions in which soluble bromide is to be in excess. The question is—Is the silver bromide affected in its properties by the conditions under which it is formed; that is, so that it cannot be afterwards modified by the action of free silver or of soluble bromide? I do not wish to include the reaction silver bromide may have with organic substances during the formation of the former. Colonel Stuart Wortley has been investigating this subject. Perhaps he can enlighten us on the one I now broach.

I quite agree with the opinion expressed at the end of a sub-leader as to the cause of the great sensitiveness of gelatine emulsion. I had intended to express my opinion in much the same terms in this letter. Gelatine films remain, as it were, in the wet state; it is not more sensitive wet than dry, as is collodion.

Everybody knows how uncertain gelatine emulsions are in keeping properties. Sometimes an emulsion will keep good for many weeks, and sometimes a few hours will suffice to make it useless. I am here speaking of decomposition proper, and for which, I believe, there is no remedy. But, as I have remarked more than once, sometimes a plate will blister while another of the same batch does not, and I have remarked this to be the case when using different developers; for instance, the hydrate as compared with the carbonate. I now think more than ever that my theory will develope into a fact. Almost every day's experience lends strength to the theory. For instance: today I have prepared some plates by an emulsion like C 3, except that the silver was in excess fifteen hours only. The gelatine had been dissolved twenty-four hours before preparing the plates. I did not expect to find the emulsion decomposed, but I tested a plate with "Franklin's" developer; it blistered slightly before the developer was washed off. On washing, the film appeared as a network of wrinkles. In a very "grumpy" state of mind I then took another plate and developed it with a hydrate developer, using the same quantity of pyro. in alcohol, and the same of water as I had of the carbonate solution. No trace of blisters was to be seen either on developing or washing. I then took "Franklin's" developer, kept it on the film as usual, and then washed off. As I suspected, the plate started a plentiful crop of wrinkles.

I think that you will own that my theory is well supported; I do not wish it to be understood that the carbonate developer must cause blisters, but that the hydrate developer will be much safer to use, should blisters occur when carbonate is employed. The carbonate developer might, perhaps, be used weaker. If we give up the latter, I believe—I may say I am certain—that we should have to give up also much of the charming rich brown colour; but what can be worse than to see a good negative suddenly expand, and then fall in folds on the glass? or, again, wrinkle as if myriads of little worms were at work? I have found, however, that the hydrate developer will cause blisters in a thickened edge or corner.

I do not know whether it would be possible to get full density by means of the fuming developer; but, if so, many a film might be saved which would otherwise wrinkle. Water may generally be applied freely if the film do not contain the developer.

It has struck me that the blisters of carbon tissue may sometimes be caused by decomposition of the gelatine either before or after coating the paper. We have never heard anything on this subject; but it is hard to conceive how the tissue can be free from decomposition, or the effects of it, while the emulsion plate is so prone to it. Granted that both forms of gelatine are equally liable to decompose, and therefore, we may suppose, to blister, how is it that carbon printers are not more troubled with the effect of decomposition? I can only say that we do not subject the carbon tissue to strong alkaline development.* Perhaps some of the carbon workers can give us a hint.

If we could only understand the cause and cure, or, failing that, how to tell when an emulsion *is* decomposed, without going through the operation of coating and dirtying "acres" of glass, the gelatine process would be enhanced a hundredfold in my estimation. It is this uncertainty that sometimes makes me almost ready to throw up the process in disgust.

I certainly should not be quite satisfied if the hydrate developer should answer as well as I hope it may, for I do not think the strong carbonate developer should cause blisters. There must be something wrong in the emulsion in such a case.

Decomposition of the emulsion and consequent blistering of the film is the only bar to gelatine wresting the palm from collodion for all ordinary negative purposes. This being the case all suggestions tending to the elucidation of cause and cure should be sought after by gelatine workers. I hope that some such, now in the field, may contribute, if nothing more, their mite.

Mr. M. Carey Lea has found that silver iodide and bromide, when used together in conjunction with gelatine, invariably fog. I certainly found this to be the case when trying my gelatine emulsions, *à la* Carey Lea. This, if not to be remedied, would debar us from making a chloriodo-bromide gelatine emulsion, even should it be more sensitive than one of plain bromide. I, therefore, can no longer ask Mr. Lea whether he can put us in the way of making such a gelatine emulsion; but, again, may I ask him whether he can diagnose the nature of my failures with his emulsion? I am a willing disciple; though, from his having taken no notice of my troubles, I imagine that he may think I am only poking fun at him. Nothing is further from my thoughts. At present I have fallen between two stools—collodion that will split up, and gelatine that, almost equally, will blister! Mr. Lea will thus see that "I could a tale unfold;" but, as a great part has already been unfolded in previous numbers, I will now leave this subject.

I notice that the formula in the article, *Photography Made Easy*, for making an emulsion allows an excess of silver of, at least, five grains before adding the *aqua regia*. It is usual to add the *aqua regia* before sensitising, otherwise fog is said to result. Even when the *aqua regia* has been added there would probably be an excess of two grains of silver nitrate. How is it that fog does not result from making an emulsion in this way? Restraining acid seems to be superfluous, except to restrain the reducing action of the tannin. I hope that the Editors will make a few remarks on this subject.

If I may be allowed a word on Dr. Vogel's reply I would remark that he does not seem to me to always draw the natural conclusion from his experiments. I allude to the point as to whether a film is heightened in sensitiveness to the rays which it absorbs or to those which it transmits. Dr. Vogel says to those which it absorbs. However, in that case, why does not napthaline red, for instance, make the film more sensitive to the blue end of the spectrum rather than to the yellow? Again: according to Dr. Vogel's theory, a blue dye should increase the sensitiveness to the less refrangible rays; but is this found to be the case? Captain Abney may "fly in the face of a long-recognised principle," but he does not appear to me to do so with the facts which came before him.

I wonder whether napthaline red increases the sensitiveness of chloride of silver to yellow without diminishing it to blue. This does not appear in Dr. Vogel's reply. If so, it might be worth while to try it in a gelatino-chloride emulsion. It has been my idea to, if possible, heighten the sensitiveness of the chloride to the less refrangible rays. It may be considered superfluous for me to enter into this discussion. This I do not wish to do, and I hope that I have not ventured too much out of my depth or flown in the face of facts.—I am, yours, &c.,

Cotheridge Court, Worcester, HERBERT B. BERKELEY.
May 13, 1876.

P.S.—Since the above was written Dr. D. van Monckhoven's communication to the Photographic Society of France has been

* A much decomposed gelatine plate will, however, blister with water alone. Why does not "tissue?"

published in the Journal. Dr. van Monckhoven has remarked the action of hot alkaline water on the pigmented gelatine during the development of the picture. He says that if the alkalinity be too strong a granular appearance is produced. Now, as I have before suggested, is there not an analogy between gelatino-bromide and the pigmented films? Will they not both to a certain extent be affected in the same way by water, whether alkaline or otherwise? While on the subject of blisters I may say that, some time ago, I conceived the idea of forming a porous cushion in and on which the gelatine film would rest, and thus, as I hoped, be held firmly. For this purpose I selected a porous collodion, but the results were not so good as I anticipated; though, as I experimented on a decomposed emulsion, I think it quite probable that some good may result. It has just occurred to me that Mr. G. Watmough Webster's insoluble substratum of gelatine might aid in getting rid of these blisters; but I think it likely that markings of the film would be produced owing to the want of an even sweep of the emulsion. I should be inclined to think that there was some free silver nitrate in "L. S. D.'s" second gelatine emulsion—that to which, according to his last letter, he added essence of cloves after washing. I have added decoction of cloves to an "excess" emulsion without any apparent discoloration. "L. S. D." has found an increase of sensitiveness to be the result of adding in effect, as I suppose, hydrochloric acid, afterwards converted by silver nitrate—whether in excess or not is not stated. If in excess there are two points which may account for the increase of sensitiveness spoken of—either that a slight accession of silver chloride is advantageous (this I doubt); or that a greater fineness of deposit may result, causing an increase of sensitiveness. If free acid were in excess at the time of the final washing—I refer to hydrochloric acid—this would be another prop to my theory of the non-necessity of free nitrate to cause the most extreme sensitiveness. I do not wish to express my conviction of the fallacy of Mr. M. Carey Lea's theory, but I may say that Mr. Kennett's pellicle contains largely—I am not able to say is entirely made up of—coarser particles of silver bromide than many an emulsion of my own make, and the former, I believe, has not been beaten in sensitiveness by me. I once entertained an idea the opposite of that of Mr. Lea; it may appear absurd, and I confess I did not honour it with the name of "theory." I thought that the gelatine might, in the case of coarser silver bromide, restrain the action of the developer less than when the two are more intimately mixed; hence greater sensitiveness would result. You start a new theory in saying that a *thin* film is sensitive above a thick one, on account of the actinic rays passing more freely through it. It has been considered best to stop, and thus make use of the rays by means of a thick film.—H. B. B.

ANSWERS TO CORRESPONDENTS.

☞ *Correspondents should never write on both sides of the paper.*

NOTICE.—Each correspondent is required to enclose his name and address, although not necessarily for publication. Communications may, when thought desirable, appear under a *nom de plume* as hitherto, or, by preference, under three letters of the alphabet. Such signatures as "Constant Reader," "Subscriber," &c., should be avoided. Correspondents not conforming to this rule will therefore understand the reason for the omission of their communications.

SIR THOMAS PARKYNS.—Received.

O. P. Q.—While the composition is most excellent, and the quality of the negative apparently all that can be desired, the printing of the picture is not at all good.

THE SCIENTIFIC EXHIBITION.—We have received some strictures on Mr. Spiller's letter under this heading in last number, the publication of which we must defer till next week.

RICHARD J. SANDERS.—The value of your business will depend upon a variety of causes, among these being, primarily, the annual returns, and the probability of encountering opposition.

J. A. H.—The views are very fine. We shall show them to some friends commercially interested in the subject of your letter, and, after hearing their opinions, will communicate with you by letter.

B. B. de P.—The crapiness in the negative arises from some defect in the collodion; but with the nature of this defect we are quite unacquainted. It is not improbable that there may be water present.

G. H. V.—In reply to your query concerning the solubility of protosulphate of iron, we give the following quotation from *Cooley's Cyclopœdia*:—"Sulphate of iron dissolves in two parts of cold, and less than one part of boiling, water."

REV. P. P.—You will find the following to be an excellent method for ensuring the presence of a small but definite amount of nitrate of silver in the gelatine emulsion:—First of all, eliminate the soluble haloid salts, either by means of dialysis or by washing the pellicle after it has "set" sufficiently; then, if the former method have been adopted, add the required portion of nitrate of silver previously dissolved in water. If, however, the latter method have been preferred, the silver may either be added to the water *after* all the soluble bromide has been removed, or to the emulsion after it has been liquefied by heat so as to be ready for use. The method here indicated answers for impregnating the film with other salts than nitrate of silver.

W. T. WILKINSON.—Received. In our next.

AMERICANOS.—If the lens be good for anything at all you should obtain with it a well-defined group of four persons on a 12 × 15 plate. Of course a lens of so great aperture and focus must not be used for this purpose unless it be well stopped down. With full aperture the pictures produced would be very unsatisfactory.

A LIVERPOOL PHOTOGRAPHER, writing concerning Colonel Wortley's letter, in last number, says that Mr. Peter Mawdsley, of the Liverpool Dry-Plate Company, years ago recommended and frequently practised great departures from the alkaline-development formula in use twelve years ago. We are quite well aware of this, having frequently conversed with Mr. Mawdsley on the subject.

J. STOKES.—An excellent machine for washing prints may be constructed out of an ordinary washing tub. Have a pipe fitted round the inside, at the bottom, the holes being pierced in such a manner as to induce conflicting currents in the water admitted through them. This will cause the prints to be continually in motion. A self-acting syphon ought to be made to empty the tub as the water rises to a certain height.

B. (South Ronaldshay).—The green colour in the nitrate of silver solution is caused by the presence of nitrate of copper. The silver from which you have produced the nitrate has not been quite pure, but has been alloyed with copper. Silver coin, which may be assumed to be the finest state in which the metal can be obtained in your part of the world, contains about an eleventh part of its weight of copper, and it is to this that the colour in your nitrate is attributable. It will not, however, prove detrimental.

JAS. LAUGHTON.—1. The shorter-focus lens of the two will be the more useful.—2. Spongy platinum may be prepared by mixing together solutions of the chloride of platinum and the chloride of ammonium, an insoluble yellow double salt resulting from the mixture. Decant the supernatant liquid, and allow the precipitate to dry until it assumes a pasty condition. Affix this to a platinum wire and hold it in the flame of a spirit lamp, when the ammonia will be expelled, leaving the platinum as a grey, loosely-coherent mass, which is "spongy platinum."

G. F. L.—Why did you spoil your negative by further intensification if you had a "lurking idea" that it already possessed sufficient intensity? The only counsel we can offer now is to remove the varnish by the method described in one of our former ALMANACS, viz., by treatment with alcohol mixed with an aqueous solution of caustic potash; and then, after washing, applying a solution of bichloride of mercury, which must be allowed to act for a sufficient time to bleach the image. In this way it may be reduced to a proper degree of intensity to enable you to obtain prints.

G. E. asks—"1. Would a rapid symmetrical or rectilinear lens for 5 × 4 plates, mounted in a shorter tube, as suggested in THE BRITISH JOURNAL OF PHOTOGRAPHY of May 5th, answer for portraiture (say three-quarter figure or large heads) on 10 × 8 plates?—2. Also, would it be equal to a 4D group lens by Dallmeyer, or corresponding lens by other makers?"——We reply: In optics there is no gain without a loss; by mounting the lenses in such a manner as to secure a wide angle of view we must sacrifice rapidity of action, because the increase of the angle included necessitates the employment of a very small stop. In this statement will be found a reply to both queries.

RECEIVED.—Dittmar's *Chemical Analysis*. In our next.

☞ Editorial Communications should be addressed to "THE EDITORS"—Advertisements and Business Letters to "THE PUBLISHER"—at the Offices, 2, York-Street, Covent Garden, London, W.C.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.—The last meeting of this Society before the recess will take place on Tuesday next, the 13th inst., at 5, Pall Mall East, when a paper will be read by Colonel Stuart Wortley *On the Preparation of Sensitive Dry Pellicle from Collodion and from Gelatine*, and a note by Mr. W. Brooks *On a Dry Plate Exposed and Developed Fifteen Years After its Preparation.*

METEOROLOGICAL REPORT,

For the Week ending June 7, 1876.

Observations taken at 406, Strand, by J. H. STEWARD, Optician.

THESE OBSERVATIONS ARE TAKEN AT 8 A.M.

June.	Bar.	Wind.	Wet Bulb.	Dry Bulb.	Max. Tem.	Min. Tem.	Remarks
1	30·29	SE	51	59	69	49	Bright
2	30·09	W	50	56	70	48	Hazy
3	29·89	SW	50	53	69	49	Cloudy
5	29·80	SW	54	58	61	50	Dull
6	30·04	W	54	56	68	53	Raining
7	30·04	W	51	59	—	53	Cloudy

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THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 841. Vol. XXIII.—JUNE 16, 1876.

FREE SILVER: ITS ACTION IN PRODUCING SENSITIVENESS.

Scarcely any subject in connection with the chemistry of photography has given rise to such an amount of controversy—not only as to its precise action, but also as to whether that action is advantageous or otherwise—as the one we propose to treat of in this article. We may even go further and say that no question of theory, in spite of the attention which has been given to it, has elicited such a variety of opinions, and, judging from the most recent writings, still remains so completely in the hypothetical stage. Practice has taught us that under certain conditions the presence of a soluble salt of silver in conjunction with the haloids tends to the production of greater sensitiveness, and, though great advance has been made of late years by taking advantage of this knowledge, further progress appears to be stayed for want of a due comprehension of the true character of the action exercised by free silver nitrate.

Before proceeding further it would be well to understand thoroughly what is meant by the term "free silver," as much doubt exists in some minds upon that point. Though the term may be in one sense applied to the condition under which a wet-plate film exists at the moment of its exposure, such an application is beyond its technical meaning, as, though undoubtedly a very large excess of silver nitrate is present, there may be, and in practice should be, a proportion of the soluble haloid still unconverted *in* the film. This arises from the difficulty with which the silver solution penetrates into the pores of the collodion, filled as they are with unevaporated ether and alcohol. The surface, however, as the ethereal mixture becomes diffused, is rapidly attacked by the bath, and the soluble haloid converted into insoluble silver iodide and bromide. Here, again, is another circumstance preventing the penetration of the bath solution; for as the silver iodide is formed it fills up the pores with insoluble matter, rendering the surface of the film impervious, and locking up the interior so thoroughly that it is almost impossible, except with an extremely porous and at the same time feebly-salted collodion, to completely convert the haloids throughout its whole thickness. The late Mr. Sutton, indeed, has placed on record the fact that a moderately-salted bromised collodion plate may be allowed to remain in an eighty-grain silver bath for twenty-four hours or longer without losing its working properties, thus proving that, as we shall show later on, a portion of the soluble haloid remains unconverted. For the same reason it will be easy to show that dry plates prepared with the bath have little to do with this question, which has, in fact, only arisen since the introduction of emulsions into general practice.

The circumstances under which the sensitive salt is formed in an emulsion differ very greatly from those surrounding a bath film. Instead of, as in the latter case, a portion of the soluble haloid being locked up and protected from the action of the silver nitrate, in the former the two are brought into the most intimate contact under the most favourable conditions for combination; and it is, therefore, only a matter of time to ensure the complete elimination of one, leaving an excess of that one which is present in the largest proportion. It is quite possible that an emulsion may contain at the same time both free silver and free bromide, as, indeed, every emulsion must do until fully sensitised; but it is only to the excess remaining after the completion of the combination that the terms "free silver" or "free bromide" are applied.

The great point of difference between the ideas of emulsion workers has always been in connection with the question of free silver; and, though the upholders of that theory have apparently proved their position, their opponents are even yet far from being convinced. In the earlier days of the collodio-bromide process it was considered a *sine quâ non* that the bromide should be in excess, and such in practice was found to be necessary; but Mr. M. Carey Lea discovered the important fact that by using an acid as a restrainer the proportion of silver might be greatly increased so as to be in large excess. This was at first supposed to violate Major Russell's law—that the presence of a small quantity of soluble haloid is necessary in order to prevent general fog; but it was asserted, on the other hand, that the acid took the place of the haloid, and, without explaining the exact *rationale* of the change, it was pointed out that the fact remained that an emulsion with excess of silver was a possibility.

So much having been gained the next step was to get at the theory or principle of the action involved—a work of considerably greater difficulty, and one which has occupied our principal dry-plate workers for many years. Passing over the minor points, the chief question has been in what way the excess of silver acts to produce the marked increase of sensitiveness which is gained by its use. The first and most obvious conclusion was that it acted in the same manner as the free silver upon the surface of a wet film, or that it exercised an accelerating effect upon the silver bromide itself. But against this theory it was urged that, the excess being removed before drying the plate, no such effect could be exercised, but that the sensitive film having been once subjected to its action the removal of the free silver no longer affected its sensitiveness, proving that a permanent change takes place in the character of the film, and not merely a temporary excitement. It was then believed that the effect was due to a combination between the silver and the organic elements of the collodion, and this theory has been up to the present time the one generally accepted.

But though in most respects the facts observed in actual practice agree with this theory, still there are weak points in the chain which lend force to the rapidly-growing belief that something more than a combination of the silver with the organic portion of the pyroxyline is involved. For instance: in forming an emulsion it has been recommended to add the silver to the collodion before bromising it, in order that the fullest possible effect may be produced upon the dissolved pyroxyline. Obviously, if the production of an extremely sensitive film depends entirely or mainly upon the formation of an organic silver compound, that mode of procedure should be, *par excellence*, the one to give the best result; but is it so? It will be found by careful comparative trials that an emulsion so prepared is *inferior* in point of rapidity to one made *with a slight excess of silver added after the collodion is bromised*, though the former method results in a more sensitive preparation than if the bromide be in excess throughout.

This result is rather disappointing to the believers in the last-mentioned theory, and, at the same time, rather puzzling; but we

think an explanation is afforded by the suggestion made by, we believe, Mr. Warnerke, that the combination takes place, not between the silver nitrate and the organic matter, but between the latter and the *silver bromide* at the time of its formation. Accepting this state of things as correct it is easy to understand how and why the continued action of the silver nitrate previous to the addition of the bromide would fail to produce the high degree of sensitiveness naturally to be anticipated if the former theory were the correct one; and it is equally easy to infer that any advantage gained by such a course of action is due solely to the fact of there being an excess of silver present during the whole time the silver bromide is being formed. It will also explain the reason why an emulsion originally made with excess of silver may have that excess neutralised by the addition of more soluble haloid without impairing to any appreciable extent its sensitiveness.

A simple experiment may be made which seems to prove that sensitiveness is not dependent upon the action of the silver nitrate upon either the bromide or the pyroxyline singly:—Let silver bromide be precipitated from aqueous solution of silver nitrate and soluble bromide in the presence of excess of the former, and, after thoroughly washing the precipitate, let it be incorporated, by means of trituration or otherwise, with plain collodion so as to form an emulsion. The films obtained from such an emulsion are, perhaps, useless for practical purposes, but still answer sufficiently well for the purpose in view, namely, to test the question of rapidity. It will be found that such a mixture, whether it be employed without further treatment or with an addition of two or three grains of silver nitrate to the ounce, duly restrained by means of acid, will be less sensitive than an emulsion prepared in the ordinary way with bromide in excess. An exhaustive series of experiments in this direction, published by Mr. Carey Lea about two years ago, may be referred to with advantage.

Very recently the question of free silver in connection with gelatine emulsion has received a good deal of attention, and the result of experiments appears to be that, if not absolutely hurtful, it is at least unnecessary. We have, then, to consider how it is that with gelatine so high a degree of sensitiveness is attainable without the use of an excess of silver at any stage of the formation of the emulsion. The only plausible reason we can suggest is that the gelatine, from its more organic nature, enters with greater ease into combination with the decomposing salts than is possible in the case of collodion, and that to the presence of a larger proportion of the organic principle which confers rapidity, as well as the more permeable character of the gelatine film, is mainly due the superior sensitiveness of gelatine plates.

In conclusion, and after carefully reviewing the whole of the circumstances attending the preparation of emulsions, we are disposed to lean towards the view that sensitiveness is dependent upon the formation of an organic *bromide* rather than organic *nitrate* of silver, and that an excess of silver is not, *per se*, either desirable or conducive to any good result. We do not mean it to be inferred from this that excess of silver is without its use, but that where it is utilised it must be present during the time that the chemical decomposition is taking place in the emulsion.

LENS MONOPOLIES AND PATENTS.

In a suggestive paper, by Mr. Aldridge, read at the last meeting of the South London Photographic Society, certain matters were alluded to as forming obstacles to photographic progress, and with respect to which there will necessarily be some difference of opinion. To two of these we will at present confine our remarks, namely, that which he designates "the great lens monopoly" and patents.

"The great lens monopoly" question troubles us a little at starting, owing to the uncertainty we feel at having a standpoint of view in common with Mr. Aldridge. By a "monopoly" we understand an *exclusive right* to manufacture a certain article—in this case a photographic lens, and, more especially, a lens of large dimensions. With this definition we shall proceed to examine the lens question from its trade point of view, believing that the more thoroughly we do so the better will it be for both the "monopolists" and the public.

If there were only one optician in the world who had the right to manufacture lenses, and if he declined to extend the privilege to others except under conditions of his own dictating, the term in question might be fairly applied; but, if our definition be correct, the facts are opposed to its application in this instance, seeing that not only is every photographer at perfect liberty to manufacture his own lenses if his inclination and ability render this expedient, but any tradesman in the world may, if so inclined, leave his usual occupation and embark in the vocation of photographic lens making. It will thus be seen that there is no more "monopoly" in this than in any other branch of photographic production, such as albumenised paper, cameras, nitrate of silver, or hyposulphite of soda.

Photographic lenses of large dimensions are necessarily articles of manufacture involving a large expenditure. The cost of their production is great, for the cost of the "raw material"—the glass—is a most important element in the ultimate price of a finished portrait lens of five, six, or seven inches diameter; and when to this are added the workmanship, the risks of breakage that have to be encountered, the legitimate business profits upon the outlay consequent upon fabrication, and the honorarium to the skill necessitated in high-class work, it will be apparent that a lens of the character indicated will be a production of a more or less costly description.

We may here be met with the remark that English manufacturers have no right to charge such prices as they do, inasmuch as instruments of similar dimensions are produced in France at half, or less than half, the prices charged in this country. That this is so admits of no denial, seeing that French lenses may be purchased at a guinea the English counterpart of which is four or five times that amount. But in the very fact that photographers prefer paying the larger to the lesser amount is to be found the answer to the allegation. They wish to possess the most perfect "tools" they can command, and it is not reasonable to suppose that any sane photographer would give forty or fifty pounds for a large portrait lens if he could obtain an equally excellent one for ten or twenty pounds. Several foreign opticians place their productions at the selection of consumers at very moderate prices; it is clearly the fault of the photographer himself if he decline to take advantage of the opportunity thus afforded, and prefer another article at a higher rate of charge.

But, it may be said, photographers prefer paying a high price to an English manufacturer on account of the value attached to the name of such maker. Well, that is right enough; and if any particular maker possess an exceptionally good name it is only in accordance with ordinary human action that as a tradesman he loses no opportunity of turning it to commercial account. It is a fact pretty well recognised that artists of eminence charge a not insignificant sum for their name. The portrait of a Duchess of Devonshire by plain John Smith may possess equal pictorial merit with the same subject when treated by Gainsborough, but, rightly or wrongly, the public will hold these respective works in very different estimation in a pecuniary sense. It is readily admitted that many very excellent lenses of foreign production are occasionally to be met with at prices wonderfully cheap, but photographers, who are the best judges of what they really require, prefer to give a higher price for the production of a maker of recognised merit; and, apart from any technical superiority possessed by the latter, the value of the *name* is fully appreciated by those who purchase the highest class of lenses as a safe investment.

There is a more purely optical question arising from a statement in the paper by Mr. Aldridge, namely, the assumption that lenses of large aperture and long focus are not constructed in a state of such perfection as they might be. The chief fault urged against such lenses is their want of depth and definition; but it is known to every student of optics that, in order to ensure the good definition of an object situated on various planes, such as the ears, nose, and eyes of a human face, one of two conditions is indispensably necessary—either that the acting aperture of the lens be very greatly

reduced, or that the sitter be removed to a great distance from the lens, the adoption of either condition being altogether inexpedient. But this department of the subject has been so fully treated on previous occasions, when we have been discussing the comparative advantages, from an optical point of view, of direct large heads *versus* enlargements from small negatives, that it is not necessary here to say more on the subject, and this the more especially as the production of direct large heads is fast becoming, if it have not already become, a thing of the past.

With regard to patents in photography: while it is certain that many patents have been obtained for exceedingly frivolous inventions, it is also certain that many of those which have been "protected" have been very valuable. We hold that an inventor has an indefeasible right to make as much as he reasonably can out of his invention; and if in doing so he present his knowledge to the State, in return for a limited monopoly of his own invention, who can object to such a course? The public have no right to grumble, for no one is any the worse, but many are much the better, for the invention. Had it been made compulsory on a photographer to adopt any patented improvement then there would have been some reason for animadversion; but until this be done—which we need scarcely say will never be the case—a photographer who declines the advantages offered by any patented invention is in no worse position than he was previous to its introduction.

For these reasons, then, we cannot discover, either in the state of the lens market, or in that of the patent law as applied to photography, any obstacles in the way of photographic progress. Photographers will purchase their lenses and chemicals from those they consider the best manufacturers; and if anyone consider that unfair charges are made for such necessary articles it is open for him, as we have said, to commence the manufacture of them, not only for himself, but for his friends.

ON THE USE OF HOPS AS A PRESERVATIVE.

Notwithstanding the great improvements that have been recently made in the various emulsion processes, and the degree of perfection that has been attained in the preparation of the emulsions, many photographers, even amateurs, are conservative enough to stick to their baths, simply because they have long been accustomed to work in that way, and because in the various bath processes there is more latitude in the road leading to success than there is with emulsion work.

It is far from our intention to undervalue the advantages of the several emulsion processes, because they require, for their most successful working, a degree of nicety and care much greater than most of the processes with the bath; but we cannot shut our eyes to the fact that there are many who, from long experience of the older methods of working, get very fine results with it, and who have neither inclination or time to battle with the difficulties of anything that to them is new. Taking it for granted, then, that for some time at least dry plates will still be sensitised in the bath, we gladly chronicle any advance that may be made or any improvement that may be effected.

Among the various preservatives that have been recommended the mixture of beer and albumen is received with much favour. The material is almost always at hand or easily obtained, the preservative is easily made, and the resulting negatives are of excellent quality, both in beauty of detail and suitability of colour, while, although a somewhat lengthened exposure is required, the latitude in this direction is very great, and good negatives are got with a degree of certainty not inferior to any other process.

As an example of how this process adapts itself to circumstances Father Perry relates that, while in charge of one of the expeditions in connection with the transit of Venus, he had with him a batch of collodio-bromide plates, but found them quite useless, and had almost given up the idea of photography altogether, when beer and albumen occurred to him. Beer, of course, was included in the supplies, and the island furnished plenty of eggs, although that was almost its only produce. Father Perry at once set about the preparation and exposure of plates, with a result well known to all who have had the good fortune to see the illustrations to his interesting lectures that have been delivered in various parts of the country.

But, although beer and albumen plates give fine results with much certainty, the preservative is not without its faults. It has a tendency to remain tacky, or to gradually become so, even after having been dried at a tolerably high temperature. As tackiness implies moisture and decomposition it is desirable that it should be overcome. No doubt beer and albumen plates occasionally keep very well, but we are aware of some which, although only a few months old, are covered with a minute vegetable growth which has completely spoiled them. The addition of carbolic or salicylic acids to the preservative may prevent this to a certain extent, but we confess to a liking for dry plates that are really dry.

With a view to get rid of such drawback, and at the same time to retain all the good qualities of this preservative, we have recently made numerous experiments, and think the desideratum has been found in ordinary hops—preferably the variety known as "Bavarian," which seems stronger in certain qualities than the English hop.

Two ounces of hops are infused for one hour in twenty ounces of water at a temperature of 170° Fah., and the whole then turned into a cloth and the liquid pressed out. When cold twenty grains of pyrogallic acid and the albumen of two eggs are added, and the mixture is well shaken for ten minutes. It is then filtered into a dish and used in the ordinary way; or, if only a few plates are to be prepared, a smaller quantity may be made, and poured off and on several times. Plates preserved with this solution dry perfectly hard, have a fine gloss, and yield negatives of very high quality. The colour is a rich greenish-brown, and so non-actinic that over-development must be carefully guarded against. Although the solution can be easily made it is desirable that, if possible, it should be made to keep, and therefore we have added carbolic acid and salicylic acid to separate quantities, and shall note the result on a future occasion.

Meantime we consider the hop preservative, as above indicated, a decided improvement on the beer and albumen. It possesses all its good without any of its bad qualities, the principal of which are the stickiness already referred to, the varying qualities of beer in different localities, and, especially, the irregular proportions of chlorides which more or less are always present, and to get rid of which many workers are in the habit of adding silver nitrate, which always introduces an additional element of uncertainty.

A very useful adjunct to the photographers' stock of chemicals will be found in carbolic acid. Its antiseptic properties render it of the greatest value in arresting decomposition in solutions of such substances as gelatine or albumen, as well as many other animal and vegetable substances which find occasional use in the laboratory. We have also recently been engaged in experiments with the acid in connection with the restraining of the developing action of errous sulphate, and for the purposes which we shall report upon in due course. A convenient form in which it may be obtained ready for use is the "solution of carbolic acid," which may be procured of any chemist; but for those who require it for experimental purposes, or who wish to know exactly what they are using, it will, perhaps, be better to employ the pure acid. This is now a common article of commerce, and exists at ordinary temperatures as a solid mass of crystals resembling, except in colour, solidified acetic acid. In colour it is of a pale pink, possesses very little odour, and liquefies readily if warmed. It is but feebly soluble in water, but easily dissolves in glycerine or a mixture of that substance with water. We employ a solution consisting of one part of the liquefied acid to two each of glycerine and distilled water, the whole being gently heated in a glass flask until solution is effected. A small bottle of this solution should occupy a place in the laboratory of every photographer, five minims of the solution representing one minim of the pure acid.

A NEW METHOD OF INTENSIFYING COLLODIO-BROMIDE PLATES.

Negatives made by any of the older forms of emulsion work will usually, if the pyroxyline have been good, yield whatever density is required by the alkaline development alone or by a redevelopment with acid silver. Once fixed and dried, however, the case is materially changed. If such negatives, on subsequent examination, be found to be less dense than desirable it is exceedingly difficult to intensify them, and they are in this respect very variable among themselves. Some, if placed in a bath of acid pyrogallol and silver, will gradually acquire density; others may remain in such a bath till it become muddy, or in a gallic acid bath for hours, and scarcely undergo any change. The worst is that such as refuse to gain density in the acid silver bath are scarcely amenable to any treatment. If they are chlorised or iodised, and then treated with potassium permanganate, this last substance has no action on them. Even Schlippe's salt acts unsatisfactorily on them; it turns the film to a dull brick-red instead of the characteristic deep scarlet, and the negative is found to have gained but little in density. Sometimes, indeed, this gain may be sufficient, but it is uncertain.

All such difficulties are got rid of at once and for all by the use of silver iodide in the emulsion, and this alone would be a sufficient reason for using it. A chloriodo-bromide emulsion plate after being fixed and dried will redevelope as easily with acid pyrogallol and silver as a wet plate. From continued experience I am convinced that silver iodide must eventually be used in all emulsions. In the meantime, however, those who still use the chloro-bromide emulsions may be glad to have a thoroughly effectual means of intensifying plates that have been washed and dried.

Amongst my plates were some negatives made several years ago, before I became acquainted with the virtues of silver iodide in emulsions, which had been placed aside unvarnished as too thin to print well, and with which I did not know what to do. Taking out one or two of them I tried all the usual methods, with no good result. I then cast about for something that would reach the case, and succeeded in finding a method more powerful than anything that has yet been tried. Under its influence the refractory negatives gave in at once, and took any amount of density that was wanted. The following is the method. It is, so far as I know, new, though in respect to intensifying processes it seems dangerous to speak too positively:—

Like most other intensifying operations it consists of two stages. The first is to act on the film with a gold solution—a plain solution of gold chloride, about a grain to the ounce. The first action of the gold solution is to blacken the surface; this blackening is so striking that when the plate is seen by reflected light it appears to have gained greatly in density, but if raised to the light it becomes at once evident that the image is thinner than before. The longer the gold solution is allowed to act the thinner the plate becomes when looked through, and the greater will be the eventual intensification. It is most convenient to use the gold solution as a bath, and, as it is not injured by use and but slightly impoverished, it can be placed aside in a vial for future use.

When it is judged that the action is sufficient (which with a one-grain solution will usually be in three or four minutes) the plate is to be removed, thoroughly washed under a tap, and then exposed to the action of an alkaline developer. The whole operation is, of course, carried on by daylight. In one or two minutes the action is complete, and the density is obtained.

I do not know of any method of intensifying which is equal in power or certainty to this. If the gold solution be used stronger, or if of the above strength it be allowed to use its full action, the intensification will be so very great that the plate will be rendered useless by excessive density. This effect can be produced by a single operation upon a very thin negative. It is easy, however, to graduate the effect by using the gold solution of the above-mentioned strength and regulating the time of action. An opinion may also be formed by the appearance of the plate. If the gold solution be allowed to complete its action, then the back of the film, seen by reflected light through the glass, will be black. The action of the gold should, therefore, be stopped before this effect is reached, and while the under side of the film is still grey.

I was led to try this method by recollecting that when a gold chloride solution is dropped into one of silver nitrate there results, instead of the white precipitate of silver chloride produced by most other soluble chlorides, a yellow one of silver auro-chloride. I concluded, therefore, that if the negative were treated with gold chloride the first effect would be to convert a portion of silver to chloride, depositing at the same time reduced gold. The next action would be a combination of another portion of gold chloride with the silver chloride formed; then the application of a powerful reducing agent would convert the gold chloride so fixed into metallic gold, and also, in the presence of daylight, the silver chloride into subchloride. The result is that we gain two distinct portions of gold and recover the silver. The advantages are, therefore, that the method gives almost any degree of strength that may be desired, can easily be regulated, and that the affinities brought into play are so powerful that even the most intractable plates are subdued. I need scarcely repeat, however, that it is much better to get rid of all that class of plates, and make use of chloriodo-bromide plates, which need no such treatment—getting rid, at the same time, of backing, blisters, and all the troubles that belong especially to silver bromide when used in the absence of silver iodide.

M. Carey Lea.

FURTHER EXPERIENCE WITH COLLOCINE.

[A communication to the South London Photographic Society.]

It is now two months since I read my first paper before this Society relative to Mr. M. Carey Lea's new collo-restrainer, and since its introduction I have used it in preference to glacial acetic acid—not on account of its cheapness, but from the fineness of the deposit that it gives and the reduction of the time of exposure, which I consider two very great points in its favour. I was pleased to read Dr. Nicol's experience with it in The British Journal of Photography for May 26th. The product he succeeded in making, he says, has a specific gravity of 1,159, while the sample made by myself has a specific gravity of 1,190. The difference is probably owing to the different strength of acid used and the sample of gelatine; but our results in its use seem almost to coincide.

I must not omit an important point in the manufacture of collocine. After the proper time has elapsed in boiling I do not strain at once, as recommended by some, but allow the surplus metallic zinc to remain for at least twenty-four hours, and by that time nearly all the free sulphuric acid is converted, so as to leave the finished compound as nearly neutral as possible.

Several friends have sent me samples of their own making and I have found them all more acid than my own. One sample in particular smelt very strong of acid; and by using a sample that is strongly acid the full value and power of it *cannot* be gained, although an acid sample will work.

We have formulæ in use for acid developers and alkaline developers, and I find that the one in question, made with collocine as a restrainer, may almost be called a neutral developer, as this one seems to step in between the two.

I have been experimenting with a developer which I made as neutral as possible and found it to work well. I think this may in some way account for its rapidity, for we are all perfectly aware that a small addition of acid to the ordinary developer makes the exposure much longer; but it is safer to work the developer *slightly* acid.

I have not as yet determined the smallest quantity of collocine possible to work with to keep the plates from fogging. It will be seen in the formulæ at the end of this communication that I have reduced the quantity recommended in my former paper (and with advantage). I have heard several say they do not like the colour of the deposit it gives; in practice I have not myself found the colour at all objectionable.

I here give several formulæ I have been experimenting with, and have found them to work well for a general developer plain and simple:—

No. 1.

Protosulphate of iron	5 drachms.
Water	20 ounces.
Collocine	2 small drops.
Alcohol	*quant. suff.*

This developer can also be used for glass positives and ferrotypes.

No. 2.

Protosulphate of iron	10 drachms.
Water	20 ounces.
Collocine	2 small drops.
Alcohol	*quant. suff.*

This developer is more rapid than the former.

No. 3.

Protosulphate of iron	5 drachms.
Water	20 ounces.
Collocine	2 small drops.
Gelatine	10 to 20 grains.
Alcohol	*quant. suff.*

After the image is fully out, by adding a few drops of silver it can be used as an intensifier; the only drawback is that it becomes rather

turbid in about a week, but works just as well. I may also mention that it gives a browner deposit than the former.

No. 4.

Protosulphate of iron	5 drachms.
Water	20 ounces.
Collocine	2 small drops.
Gum and sugar solution	½ ounce to 1 ounce.
Alcohol	*quant. suff.*

The gum and sugar solution is the same as used by Mr. Lea in the preservative of the last emulsion process that he published. This gives full printing density with one application of the developer, providing the plate is not over-exposed.

No. 5.—*Protonitrate of Iron Developer.*

Protosulphate of iron	5 drachms.
Water	10 ounces.
Nitrate of lead	1½ drachm.
Water	10 ounces.

When dissolved add the two solutions together, filter out the white precipitate (sulphate of lead), and then add two small drops of collocine and the requisite quantity of alcohol.

This developer I like better than any I have tried. It gives a finer deposit than any of the former, and full printing density is gained with one application, as the negative I pass round will show.

I have not yet had time to speak as to the keeping qualities of this protonitrate developer; but I should think, so far as my experience goes with it, that it will keep far better than with an acid used as a restrainer. WILLIAM BROOKS.

FADING AND TONING.

In these days, when the cry of "carbon and permanency" as opposed to "silver and fugitiveness" is so rife, the photographer does well to consider the advisability of parting with his old love and attaching himself to the new candidate for favour. Still there is a certain reluctance to discard a process which has made photography popular as it is, more especially when, from some reason or another, silver prints are and have been in existence for more than a quarter of a century without showing any signs of dissolution, and are, in fact, as permanent as carbon pictures or any other kind. No process, in its wildest aspiration, can be expected to produce *more* beautiful results than those produced by the silver process; anything approximating to the "silver print" is considered a triumph.

Pondering on these matters, and having examined a large quantity of silver prints made during the past twenty-five years, I was struck with the fact that the greater proportion of the faded ones were (in those cases where the means of production could be remembered) confined to those proofs that had only been slightly toned and those printed from thin negatives. Where the operations necessary to their manufacture had been thoroughly performed, the negative a strong one, and the toning a full black, such prints had not faded or in anyway altered when unmounted. Duplicates produced at the same time, in the same way, and mounted, had faded or changed colour, especially at the edges, but to a much less extent than any of the slightly-toned proofs. This examination suggested the following questions:—Is a "silver" print a print in silver? or is it in the process of toning changed into a gold print? Is a gold print permanent if a silver print be not? Is a silver print produced from a thin negative and toned slightly, as is now the fashion, a *metallic* picture? or is the organic matter in the presence of silver nitrate merely darkened in colour, so that the image consists of a *stained organic surface and not of a deposit of either gold or silver?*

In answer to these queries a *thoroughly*-toned proof made from a vigorous negative can contain but a trace of metallic silver, for this reason—where there is a well-managed scheme for saving residues seventy-five per cent. can be easily recovered. This means that a sheet of paper of the ordinary size sensitised on a sixty-grain bath will take up less than thirty grains of silver nitrate. Seventy-five per cent, or three-quarters of this, is recovered from the residues, leaving about eight grains to be utilised in the formation of the image and to allow for waste. Each sheet of paper so prepared is sufficient to make forty card pictures, which one, some say a half, grain of chloride of gold will tone, and leave a considerable amount of gold to be recovered from the used-up and inert bath. The weaker the silver bath, and the browner the proofs are toned, a proportionately smaller quantity of the metal must remain in the proof—an almost inappreciable quantity; so little, in fact, that we are almost justified in saying there is none at all. If the negative be a vigorous one and the toning thorough more metal is taken into use. As in the previous case, the silver is nowhere, but the image consists of a more permanent stain. I can scarcely term it otherwise.

Looking at silver prints from this standpoint we may pronounce them more or less permanent in proportion to the amount of metal to the strength of light and to the length of time the paper has been subjected to its influence. The long-continued action of light or sunshine and a paper highly charged with silver nitrate seem, if other usual precautions be taken, to be the principal conditions for ensuring permanency in silver printing; and as we reduce the strength of our sensitising bath and tone warm so we proportionally deviate from the conditions of permanency. If we consider the extreme delicacy of the image formed, and the very imperfect manner in which the manipulations are frequently conducted, the wonder is that silver prints are as permanent as they are. Moreover, a lightly-printed image on albumenised paper is extremely sensitive to the long-continued action of vegetable and other acids, chlorine, and sulphur that would not affect a strongly-printed image. Light of itself seems to have no effect in causing silver prints to fade unless assisted by some chemical that may remain or be formed in the image subjected to its influence. Such agents simply discharge the colour, sulphurous acid being one of the most active of the series, having very powerful bleaching influence on all organic matter, and one most likely to be the agent at work in the majority of cases of fading. Such decoloration may proceed from the decomposition of the size in the paper or from the albumen itself. A print subjected to moisture and warmth will soon become spoiled from this cause, however well it may be washed.

We must, to obtain permanency, take precautions against these changes by adding some preservative substance to the albumen. Picric acid and arsenic would, in all probability, have this effect; but the dangerous character of these substances might be objected to. The quantity required would be so exceedingly small that danger from this source would, at anyrate, be very slight. Thorough toning is another precaution, as the stain produced by gold is of a more permanent character than that by silver. The deeper the stain the more permanent the picture. But, again, if the toning process be continued until the shadows are much flattened the advantages of the gold are somewhat neutralised. It is almost an impossibility to produce a rich, thoroughly-toned picture from a very thin negative—that is, a negative which offers very little resistance to light in the dense portion—as the exposure must be necessarily short if the light be good, or very weak light must be used for a longer period. Either plan will not form a stain of sufficient intensity to permit of its colour being changed without loss of richness.

Formerly hard, chalky negatives and strong baths were the rule, with highly-salted paper. This necessitated long printing and strong light; but such prints would stand almost any amount of toning without getting flat, and the proofs, when carefully prepared in other ways and well washed, are to all intents and purposes as permanent as carbon, if not more so. The fashion of thin negatives and brown tones, irrespective of anything else, has brought silver printing into disrepute as to permanency. I am of opinion that a well-toned print from a fairly strong negative, carefully manipulated throughout, is as absolutely permanent as a print by any other method; and, if care be taken to ensure the absence of known deleterious matters in mounting and finishing, such prints may be conscientiously sold to the public as permanent. EDWARD DUNMORE.

OBSTACLES TO PHOTOGRAPHIC PROGRESS.

[A communication to the South London Photographic Society.]

In addressing you tonight I cannot but feel how inadequate must be a paper of this nature to the extent and importance of the subject; for perhaps any one of its branches would, to do it justice, require greater time than the necessary limits of such papers will allow me to devote to the whole. It is, therefore, principally in the hope that the following observations may call your attention to our difficulties, and provoke a discussion which can scarcely fail to benefit the art—for, as old Homer says,

> "Such brave contention works the good of men"—

it is (I repeat) with this motive rather than in the hope of settling by any words of mine any of the points under review, that I venture to bring the subject before you.

If I were required to characterise the present stage of the photographic art I should call it the "age of uncertainty." Were I disposed to be cynical I might, perhaps, call it the "age of nostrums." No sooner does one practitioner meet with a mishap (and what photographer does not?) than a dozen others rush to the rescue, each with his own infallible cure, which is so simple and so certain that it really appears ridiculous on the part of the poor patient to con-

tinue to suffer from a complaint that ought to be wiped from the face of the earth; and yet, notwithstanding all these certain remedies, our photographic infirmities are very numerous and, I will venture to say, very real. At present not only our methods of working, but our chemicals, the tools with which we work, and, though last not least, the paper which generally forms the groundwork of our pictures, are all open to doubt.

It has been lately demonstrated beyond the power of contradiction that a photographic "thing of beauty" is *not* "a joy for ever." The fading of the silver print is beyond all question; and in this matter of permanency it is but too evident that we have actually retrograded. This is a matter deserving our most serious consideration; the want of permanence is an obstacle that must be overcome if the art is to maintain its proper place in the eyes of the world. Photography at the present time seems to have reached a similar stage to that of painting in this country during the latter half of last century. One artist at that time contended that the secret of producing great works was to be found in the use of wax; another would prescribe as the great panacea soap-suds or some other compound equally secret and equally nasty. These quackeries excited the disgust of John Opie, who answered some inquirer for a recipe for the making of great pictures by advising him to mix his colours "with brains." This eminent artist also tells us of a young lady, still in her teens, who undertook to teach Royal Academicians how to paint for the small consideration of five guineas each.

Our "process-mongers," as our friend, Mr. Jabez Hughes, appropriately styles them, have greatly improved upon this very modest estimate of the value of their great arcana, and would certainly look down upon so small a payment. I think one of the best arguments that could be adduced against those who call in question the respectability of photographers might be drawn from the large sums of money these skilful practitioners manage to draw from the overflowing pockets of our too-confiding brethren. These secrets are sometimes to be paid for by a handsome *douceur* and a promise of secrecy, but more commonly take the form of a patent. These patents I consider form one of the most annoying obstacles to photographic progress. The pretensions to originality are often of the most meagre character.

Not long since there was the "what-shall-I-call-it process, for improving photographs into works of fine art." This was effected by means of crayons and pumice-stone. Now in crayon painting crayon and pumice-powder generally go together. There is a paper made for the purpose called "*papier pumicif*," or pumice-stone paper. It was acknowledged by the patentees to be a customary thing to use the pumice along with the pastels; but we were gravely threatened with various pains and penalties if we should in any way get them mixed. Another patent introduced a no less ridiculous obstacle to our progress in the way of retouching. No objection would be raised, we were told, to our putting tissue-paper on *either* side of the glass negative; but to put it on both would be an infringement of the rights of the patentee. These things would be exceedingly ridiculous if they were not, at the same time, hurtful to the photographic art, and, to my thinking, also lowering to the character of those who set up these obstacles to our progress.

Another difficulty, especially to those whose pockets are not overflowing with "that good, that golden mean" which has enabled men to overcome so many obstacles both in and out of the profession, is found in what I will venture to call "the great lens monopoly," by which we are obliged to pay a heavy price for a necessary tool, and that article, if required to be anything beyond the ordinary calibre, generally of a very unsatisfactory character. In speaking of lenses I here mean more especially portrait lenses up to a certain size—say whole plate. They can undoubtedly be had of good quality; but every step beyond that size only demonstrates their imperfection either in the great length of time required for the sitting or in the want of depth, which latter gives a bad definition, a want of focus, and the resulting false perspective. Now that I have enumerated some of the principal obstacles to our present progress I feel very much inclined to quote the old maxim, "There is no obstacle to him that wills." At anyrate, while rejoicing that we have got so far, I certainly think we have not reached that stage when we should rest and be thankful. I shall certainly rejoice if these few remarks should induce any older and abler member than myself to take up any one of these obstacles and show us how to overcome it.

R. W. Aldridge.

ON SMALL SCALE MAPS FOR TOURISTS.

[A communication to the Edinburgh Photographic Society.]

By the term "tourist" I do not mean a creature who rushes by train over an interesting route, however much he may gaze about and, painfully to himself and his fellow-passengers, crane his neck out of the railway-carriage window; nor his brother excursionist who, on top of coach or deck of steamboat, hurries on his way in spite, it may be, of darkness or mist, only determined to *do* the thing, and taking more interest in doing it swiftly than in observing the scenery or noting the historical mementos or natural features which have rendered the district a fitting arena for the creations of the poet, or made it the favoured haunt of the artist or the antiquary.

Perhaps at the present day the tourist worthiest of the name is he who judiciously combines pedestrianism with the abundant facilities of being conveyed from one centre of interest to another. But even one who does not shine as a walker may yet gain a delighted experience and an intelligent though limited knowledge of a district by making full use of his opportunities from the top of a coach or the deck of a steamer, supposing him fortunate in weather and well-informed as to what he should see and when and where to look for it. For these latter provisos, however, a really good map is indispensable. But the difficulties and discomfort attending the process of referring in the open air to a folding map are so great that, rather than subject himself to the ordeal, he will too often allow what might have proved subjects of great interest to him to pass by unheeded, and often afterwards he may have to regret the lost opportunities.

We, no doubt, have all experienced, and watched others experiencing, the discomforts of this operation of referring to a folding map—it may have been on the top of a coach or on board of a steamer going at full speed. How that map did keep writhing and wriggling about, defying all careful inspection, and perhaps at last flying loose like a flag in the breeze, and getting itself torn into shreds or making its escape from the binding altogether! But why should we be left in this ridiculously helpless condition when, by means of photography, all that the unmanageable map contains could be condensed into one or two small pages of a guide-book or pocket atlas? I have, during some years back, frequently urged upon lithographers and others the expediency of publishing such maps, and can only marvel that the desideratum has not yet been supplied.

Some years ago one-page detailed maps of the more interesting parts of Scotland were given in *Murray's Time Tables*, and, I am sure, very many persons must have highly appreciated the convenience of referring to these. They have now, unfortunately, disappeared from that guide-book. Probably the smallness of its price would not admit of their continuance; but I feel assured that a thin pocket atlas of similar maps would meet with a ready sale. What I in this paper propose is to go further in the same direction—to produce maps not requiring to be unfolded, and yet, by calling in the aid of photography, to render them rich in information though small in size. Held firmly in the hand, all that would be required is a lens of say two or three inches focal length to read the smaller lettering; such a lens may be bought for a shilling, and every botanical student carries a more powerful one.

Visibility to the Unaided Eye.—The legibility of printed matter depends—First, upon the lettering being of a good, bold character on a good paper; second, upon good lighting, daylight being much better than any artificial light; third, upon the focal adjustment of the eye being well suited to the distance of the object; and, fourth, upon freedom from astigmation or other defects of the eye.

All these requisites for perfect vision being given, print may be read though placed at a distance equal to 800 times the height of the smallest letters. But for ordinary eyes under very moderately favourable circumstances 500 times may be taken as a limit of distinct vision, and in order that reading may be performed with comfort we may assume 400 times the height of letter as a standard. Probably the majority of persons are able to adjust their eyes to read at a distance down to eight inches; the four-hundredth part of this is $\frac{1}{50}$th of an inch for the height of letters they will be able to read readily in a good light; but, if assisted with a seven- or eight-inch lens, they should be able to read good lettering of the height of one-hundredth of an inch. A long-sighted person, just able to bring parallel rays to a focus, would require a lens of four inches or shorter focal length to read the print having a minimum height of 0.01 inch.

In the cases of several reducing processes for printing on ordinary paper I am disposed to think that the reduction in size should not be carried beyond, or much beyond, this limit of 0.01 for the height of the smallest letters. The chief considerations which lead to this conclusion are—the difficulty of procuring dense negatives without having the finer lines more or less closed up, and the coarse, blanket-like nature of the surface of ordinary papers, as seen under a moderately-magnifying power. In even very excellent map and print work the amount of imperfection in the lines disclosed by the microscope is very surprising.

When the printing is to be done photographically, either on albumenised paper or similar surface, a greater reduction may be ventured upon; and if the final prints are to be on collodion, either as positives or as thin transparencies transferred to white mounts, a very greatly-increased reduction may be adopted if desired.

I here show a positive collodion copy of sheet No. 25 of the Ordnance Survey of Scotland, reduced to a scale of nine and a-half miles per inch. To give an idea of the minuteness of the lettering in this we may take the word "station" near Melrose. The length of this in the copy is only the one-fortieth of an inch, and the height of the letters one-three-hundred-and-fiftieth of an inch, or less; and, judging from the distinctness, it is evident that good lettering one-five-hundredth of an inch in height would have been legible. The usual lettering in this map is not very well adapted for reduction, being of script character with very fine hair-strokes.

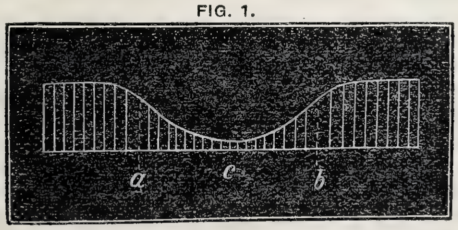
This leads us to the question of how fine the lines to be copied may be made. Among the many circumstances upon which the reply will depend the three following are the most conspicuous:—(*a*) the perfection of the definition of the lens; (*b*) the degree of intensity to be given to the negative, and, perhaps, upon its chemical character; and (*c*) the final process to be followed in producing the prints.

The lens question is a very important one, but I shall here dismiss it with two brief notes:—1. The finest central definition will be got with the lens of shortest focal length; but the focal length must be chosen sufficiently long to suit the size of the negative to be produced. 2. A very small aperture may be used, but the benefit as regards definition, even for the oblique pencils, has its limit from the increasing bad effects of diffraction.

A number of years ago I experimented upon an ordinary view lens, having a focal length of four and a-half inches, placed with its flat side towards the stop and view. I found that for direct pencils the most perfect definition was obtained when the diameter of aperture was one-eighteenth of the focal length. When the aperture was made less than this the confusion arising from diffraction more than counterbalanced the benefit of further reduction of the spherical aberration; but the best size for oblique pencils would, of course, have been much smaller than this. I have recently been trying an aperture with a diameter only the eightieth of the distance from the plate to the lens.

The greatest difficulty in the way of getting good results by most of the processes arises from the tendency of the fine lines to become contracted, clouded, and choked up on pushing the development in order to get a dense negative. There seems no practical limit to the minuteness of definition in small-sized positives—that is, in very thin negatives; but when the development into a negative is proceeded with deterioration goes on increasingly. To make this clearer and point out some of the causes of this let us take the simple example of one fine black line upon a white ground to be photographed. The actinic impression made upon the collodion film by the exposure cannot, for several reasons, be regarded as terminating with absolute abruptness at the edges of a sharply-defined representation of the line; the actinisation will, as it were, be shaded off. Again: even the central part of the image of the line cannot be regarded as absolutely free from actinisation, since active light cannot be altogether excluded. In the dark room there is always some actinic light, and from the surfaces of the lenses some portion of the light will be scattered. The degree of action latent in the film may, therefore, be represented by the height of the shaded parts

FIG. 1.



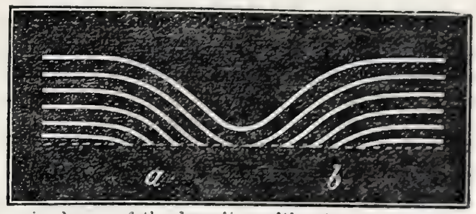
Actinisation at image of a very fine line.

in such a diagram as *fig.* 1, where *a b* is the true width of the line, magnified, it may be, one thousand times.

Now, if the development be stopped as soon as any appreciable deposit has taken place, the image of the line may possibly be exaggerated in width. In a very thin positive it may happen to be nearly correctly given, or equal to *a b;* but on pushing the development the less actinised parts of the film begin to play their part, and the line becomes narrowed more and more, and then a fog may set in at *c*, where adventitious light has alone acted.

But over and above this there is another cause of the closing up of the fine lines. If we examine a negative rendered dense by much development with pyrogallic acid and silver we at once see that the deposit is of a very considerable thickness. It is obvious that this in being formed will grow not only in a vertical direction, but also laterally, and the deposited particles will gradually contract the channel representing our line, exactly as in the case of an electrotype deposit. This latter cause of deterioration is probably the

FIG. 2.



Successive layers of the deposit resulting from the development.

most important one standing in the way of our getting a good, dense negative with fine, sharp lines. It would greatly reduce the evil if we could get a deposit of a more purely metallic character, so as to be of inappreciable thickness. Another mode of attacking it would be to begin by making an etched negative, by tracing the map upon a sheet of glass covered with a transparent yellow coating, and from this make a reduced, well-developed transparency. By this the fine lines could be exaggerated in width, to allow for the opposite tendency in the third operation of making from this transparency the working negative.

However, until further light be thrown on these suggestions by experiment, the surest course to pursue in the meantime, where much reduction of scale is wanted, will be to re-draw the map to be copied in a manner sufficiently bold to meet the requirements of the intended amount of reduction. I here show a portion of the one-inch Ordnance map so re-drawn, with a view to its reduction to a scale of ten miles to the inch, and also place before you a copper photo-relief block for surface printing, made on that reduced scale from it by the Typographic Etching Company, 23, Farringdon-street, London.

The one-inch Ordnance map itself is not, as I have said, well suited for reduction—not so much from smallness of size of the usual lettering as from its script character and the exceeding fineness of the hair strokes. The Typographic Etching Company have been endeavouring to reproduce a part of this map for me on a scale of three miles per inch, and I still hope they will be successful, as it would reduce the sheet to a convenient size as a two-page map, or the English half-size sheet to go upon one page, the measurement over the real map work being only 6 × 4 inches. That any great difficulty experienced by them in this reduction is altogether due to the exceeding fineness of the lines is proved by the specimens of their work I have the satisfaction of laying before the Society. I would especially draw attention to their copy of a page of *The Times* newspaper reduced 4·7 times in lineal dimensions or twenty-two times in area. The smallest lettering is only about 0·0075, or, at anyrate, less than 0·008, inches in height, and this can be read in a bright daylight by a good, unaided eye that can see clearly at a distance of five inches or less.

To Messrs. Dawson, the managers of the Typographic Etching Company, I beg leave here to express my thanks for their endeavours to carry out my notions with respect to small-scale maps, and for providing me with the beautiful specimens of their work I have laid on the table for your inspection. All must admire these; and from the small charge at which they can be produced the process must be regarded as commercially successful.

The Different Methods of Producing Reduced Copies of Maps.—I may now refer to some of the many processes by which the small-scale maps may be made:—

1. First in our list, as possessing the greatest power of minute delineation, come the positive collodion copies taken directly from the map, and supported either upon glass, mica, or blackened plates of suitable materials, or transferred thereto.

2. Collodion transparencies of a thin character taken by the reducing camera from large-sized negatives, which need not be dense. These may be transferred to suitable white mounts.

3. Silver prints on albumenised paper from dense, reduced negatives.

4. The Typographic Etching Company's photo-relief block printing in ordinary printing-ink.

5. Photolithography. As a fair specimen of this I produce the frontispiece given in vol. iii. of the *Popular Science Review* (1864). It is a copy of a page of *The Times* newspaper reduced about four times.

6. The Woodburytype. Of the merits of this for very minute work I cannot speak.

7. Copperplate printing from photo-etched plates.

8. The last process I have to name is that patented by Mr. Joseph Lewis, of Dublin, and the specimens I hand round were given in The British Journal of Photography for May 25, 1866. This is not at all a photographic method. The reduction is effected by means of the contraction of a sheet of vulcanised rubber, on which, when in a stretched state, the design has been printed in a greasy ink. After the contraction the design or print is transferred to a polished lithographic stone. Preliminary to this process we must, of course, have the subject in a printing state on the large scale.

From improvements in the production of dense negatives to give good silver prints, or by employing the collodion processes, it does not appear unreasonable to expect that the Ordnance map may be reduced to a scale of four and a-half or five inches to the mile, so as to comprise in one page of portable size the sheet measuring in its original form 24 × 18 inches over the real map work. Or it would be possible to re-draw this sheet with a bolder style of lettering without rendering it necessary to omit much of the detail, and so fit it to be reduced to the desired extent by some of the cheaper ink-printing processes. R. H. Bow, C.E., F.R.S.E.

ON THINGS IN GENERAL.

I have often wondered who it is that takes all the baby pictures one sees in every friend's album, and at last I have, I believe, discovered one of the fraternity, who, according to "information received" some years ago from one who was cultivating his talents (or should I say "gifts"?) in that direction, require very special qualification for their work. Said he—"You must laugh and cry, and shout and yell, jump, dance, grimace in all manner of ways, and, in short, make a complete fool of yourself, and then you will be sure to succeed." Here is my "find," in an advertisement recently culled from among other choice flowers of composition:—

> A First-rate Retoucher wishes for an Engagement in a high-class establishment (London only); is also an experienced and practical operator, capable of taking any position in the studio if pressure of business required.

I wonder if this gentleman could stand on his head "if pressure of baby business required?" Such a refreshing novelty ought to succeed *à merveil*. My friends generally are of late by no means complaining of press of business of any sort. It is to be presumed that they are all improving their minds by paying visits to the Paris Photographic Exhibition, or to the Loan Exhibition at South Kensington. The latter collection is a most puzzling affair altogether, and seems quite to be giving rise to two parties in the literary world—the one displaying an immense amount of enthusiasm, and the other contenting itself with disparagement slightly removed from gentle, and badinage as nearly scornful as befits an entertainment in which Her Most Gracious Majesty herself has taken an interest, and positively uttered the words "how beautiful!" The following extract from a literary and scientific contemporary hits off these two phases of opinion to a nicety:—

> "Special railway trains have, we are informed by our contemporary, *Nature*, been built for the transit of instruments, and the result is a collection of brass, glass, and old iron relics which have driven the daily press wild with enthusiasm."

I am really afraid that this marine-stores idea will strongly leaven the ultimate verdict of the country generally upon the experiment. I feel pretty well assured that, taking the photographic department as a type, the locked-up riches it contains will fail to convey much instruction, if I may dare to say so without first obtaining the opinion and consent of Mr. J. Spiller, whose recent extraordinary effusion will, no doubt, have the effect of bringing the Editors to order. Again: I feel constrained to say—"Save us from our friends." Poor Colonel Stuart Wortley's only claim to have his fine pictures recognised is, according to his champion, "their being displayed in an advantageous position."

It is difficult to see why in the handbook to this exhibition, which contains some most excellent treatises, a branch only of photographic operations should be selected for treatment. Being written by a F.R.S. elect it is, of course, all right; but to my weaker intellect it would have been a more acceptable contribution if it had contained more breadth of subject-matter. Most of the handbooks in the series to which this one belongs possess very great merit; but this Loan Collection manual is of very unequal merit, and possesses some pages that appear very like "padding." Why, for instance, among the unusually few engravings in the book need there have been inserted, on page 112, one of an optical instrument (!) that can be seen at every toyshop in the kingdom? There is no reference in the text to the illustration, which suggests an absurd crab making love to a perpendicular and virtuous pepper-box; and we are left to discern for ourselves whether, to use the words of the book, it is an example of "diagrams appertaining to a non-Euclidean space, in which form and magnitude do not remain the same when a figure is moved from one part of space to another, but are themselves functions of the position," or of the fact that "cylindrical and conical mirrors have been used for showing the effect known as the 'anamorphosis,' whereby drawings suitably distorted were restored to their proportions." The reader may depend upon it that when my eldest son purchased one of these scientific instruments, the other day, under the impression that it was a toy, he obtained a sound castigation for his wretched ignorance, which was aggravated by his remark—"See what a funny looking-glass I've bought!" Fancy anything referring to a non-Euclidean space, or even an anamorphosis, being termed "funny!"

I am thankful to find out that the theory of photography is not such an abstruse affair as some would make it out to be, and all the *fanfarronade* of sub-iodides, molecular combinations, and all that mystification may be swept from our path, for the author of the photographic essay alluded to tells us more than once that light separates such substances as iodide of silver into more elementary forms; and as, thanks to the Editors' good teaching, a very unchemical reader knows that that substance is one of the simplest types of compounds, it is easy to grasp the writer's meaning.

The polychromatic process of M. Vidal, as there described in the final paragraph, is, however, I am afraid to say, a thing of the past. The beautiful ingenuity of the method seems not to be able to bear the touchstone of commerce, for the polychromatic cloak has descended upon something of a very different nature. M. Vidal may be seen semi-weekly at the photographic exhibition in Paris showing the power of photography in the printing-press and with printers' ink, his demonstrations being well attended and watched with the most lively interest. He is a most enthusiastic and intelligent experimentalist with all kinds of "carbon" work.

One of the most excellent little companions to exhibitions ever published here is Mr. Blackburn's *Academy Notes*—a series of about a hundred miniature woodcuts of important pictures in the Academy, which are accompanied by brief descriptions and occasional very discriminating criticism. These illustrations are produced by a photo-engraving process, either from sketches from the artist himself or, when they were not so available, from Mr. Blackburn's own sketches. Nothing could better exhibit the advantages or disadvantages of photography so applied, some pictures being as perfect as though direct from the artist's pencil, others little better than incoherent smudges.

Our neighbours across the channel experience the same troubles as we do upon occasions of exhibitions, and sins untold of omission and commission are supposed to lie on the selecting committee's shoulders. In the last number of the *Moniteur* a correspondent complains with apparent justice of the rejection of his pictures because of their being a little too far removed from the limits of pure photography. The editor, after speaking most highly of the pictures themselves, endorses the writer's statements, very properly saying that the writer's artistic process does not possess any less interest than photography itself. These pictures were done in carbon, and there is a large amount of very beautiful work there in so-called permanent pigment. If a correspondent of this Journal for May 19th, who writes, "carbon prints are pretty and a novelty, but they are not to be compared with silver prints, either for beauty or certainty of production," were either to run over to Paris or look about him in his own country to observe what can be done in carbon, I think he would soon eat up his words, for there is no question as to the beauty of such carbon work as has been turned out of many studios this year. A very important contribution to the manipulations and technicalities of this branch of the art has been made by Dr. van Monckhoven to the Photographic Society of France. It seems to have been an extract from his new work on carbon printing.

I hear that the carbon votaries of one of the many patentees who have so often of late absorbed photographers' gold, are banding themselves together into a mutual admiration society, with the intention of presenting periodical prizes to one another, and defending themselves from unlicensed perverters of processes.

That permanent pigments have had their share of attention lately no one can deny, transparencies and enlarging having come to the fore. Much wind seems to have been raised about alleged secret process in connection with them, but, as far as I can see, to no purpose, seeing the Editors have published all that is material to know on the subject.

If the Editors wish success to carbon they must not write any more "*Waste Not, Want Not*" articles, which, capital as they are, will rouse great hope in the bosoms of the wives of every votary of the art—and visions of tea sets and services of plate will arise before her delighted gaze only to melt in thin air, when she learns that soot and glue are about all she could get for her share of recovering waste.

The discussion on photographic waste in the German photographic societies has ended as it begun, nothing having been brought forth that was not long since known on the subject. I suppose their journals lack the enterprising spirit which animates such publications as, for instance, THE BRITISH JOURNAL OF PHOTOGRAPHY, which does not allow any subject to pass its purview until it has been thoroughly exhausted. The President of the Vienna Photographic Society, when laying upon the table copies of the *Agenda Photographique* and the *Aide Memoire de Photographie,* which had been presented by their respective editors, took occasion to remark on the superiority of the English and French manuals, putting it down to the score of the lack of advertising support to Austrian photographic literature. He should learn that advertising follows circulation, that being consequent upon excellence of literary matter—the two going hand in hand in THE BRITISH JOURNAL PHOTOGRAPHIC ALMANAC in an unparalleled manner. He would, on seeing it, surely say the apotheosis of advertising had arrived.

I cannot resist adding to the already great length of my lucubrations by advising everyone who enjoys genuine humour to buy *Discursive Chemical Notes in Rhyme*, published by Van Voorst. A copy has just been sent to me, and here is an extract relative to water. What the writer says on photographic chemicals must be looked for in the original:—

"Water! from which our old friend hydrogen
Derives it's name, now we must speak of thee—
Loved by teetotaller and other men,
Who drink thee in thy native purity;
Though some, alas! oft find thee very handy
To mingle with their whiskey or their brandy.

We know thee, water, in the crystal rill
Of which the poets sing, and in the river,
In the wild-running brooklet wandering still,
Which Tennyson affirms 'goes on for ever'—
From the great ocean to the starting tear,
There art thou seen, though rather salt, I fear.

And in the white north, as thick-ribbed ice,
Or snow immortal dost thou take the form,
Making a mountain with vast precipice,
Careless of sun, insensible to storm;
To break the solitude alone are there
The mighty walrus or the polar bear.

* * * * * * * *

As water is a solvent, 'twould be odd
If in its pure state it were ever found
On the earth's surface; for from sand or sod,
Chalk pit or gravel, every sort of ground,
Traces, or more than traces, of these latter
Become dissolved as inorganic matter.

And even ere profaned by touching earth,
Caught as the rain distilling from the sky
In open country spots, it has no worth
For subtle processes in chemistry;
The snow of winter and the summer rain,
$H\,N\,O_3$ and $N\,H_3$ contain."

FREE LANCE.

Meetings of Societies.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.

THE usual monthly meeting of this Society was held on Tuesday evening, the 13th inst., the chair being occupied by Mr. J. Glaisher, F.R.S., the President.

Colonel Stuart Wortley read a paper *On the Preparation of Sensitive Dry Pellicle from Collodion and Gelatine*, which we expect to publish in our next number. In the course of the paper he described the means he adopted to test the comparative degrees of sensitiveness of dry plates. These comprise the use of a negative prepared by a method of which a good idea may be formed from the following description:—A sheet of "mineral paper" is divided into sixteen squares by horizontal and vertical divisions of four each. These are respectively marked "A 1," "B 2," and so on, the lettering being made with opaque ink. The first square or division has only one thickness of paper; the second has two thicknesses; and so on to the last, which is composed of sixteen layers of the paper. When this sheet is placed in contact with a sensitive plate, and is exposed to a light of uniform intensity for a definite time, the resulting picture, when developed, may be compared with others upon different plates exposed under similar circumstances. Uniformity in development is obtained by placing the plate in a tray with a "well" at one end, the bottom of the tray consisting of orange glass, and a water-tight top, also containing orange glass, folding down upon the tray, so as to admit of its being held in a vertical position without leakage of the developing solution. A piece of india-rubber tubing, partially sunk in the wooden frame, surrounds the cavity of the dish, and against this the top is pressed closely by means of a thumb-screw. Appropriate apertures provide the means for the admission and withdrawal of the developing solution, and the coloured glass bottom and top enable the operator to watch the progress of development, which may be timed by means of a watch.

Pellicles and pellicular negatives were also exhibited in illustration of the paper.

The CHAIRMAN said that as Mr. Kennett had brought several very fine pictures for exhibition, which had been obtained from gelatine pellicle negatives, he would ask that gentleman to make some remarks on the subject.

Mr. KENNETT said that Colonel Wortley had referred to Mr. Johnstone as having been the first to make a pellicle, and he would ask Colonel Wortley where he had found it recorded that Mr. Johnstone ever made a pellicle at all.

Colonel WORTLEY replied that in THE BRITISH JOURNAL OF PHOTOGRAPHY, six days before the date of Mr. Kennett's patent, Mr. Johnstone had instructed them how to make an emulsion, to pour it out in a dish, to cut it into strips with a glass rod, and then wash it; and (added the speaker) if that be not a pellicle, what is it?

Mr. KENNETT: Did Mr. Johnstone dry it?

Colonel WORTLEY said that if, instead of using it immediately, he allowed it to stand for a day or two it then became a dried pellicle.

A certain amount of personal feeling here became imported into the discussion upon Mr. Kennett's remarking that Colonel Wortley had all along tried to damage his patent; but the Chairman ruled that the subject of the validity of Mr. Kennett's patent could not be entertained by the Society. The nature of the few remarks that followed could scarcely be understood without reference to the paper.

Mr. WARNERKE said that the thickness of the pellicular negatives exhibited was such as to render it apparently difficult to attach them to glass, and he inquired what means were adopted to print from them.

Colonel WORTLEY found that it was not necessary to attach the films to glass in order to obtain prints.

Mr. V. BLANCHARD observed that he had had a good deal of experience in printing from negatives on albumenised paper, and they were much stiffer and more unmanageable than the pellicular negatives exhibited, yet he had not experienced any difficulty in printing with them. He inquired how a plate prepared with the emulsion described compared with a wet collodion plate as regards exposure.

Colonel WORTLEY was unable to answer, as he had not tried their relative rapidity. The process was a good one, and he hoped the members would give it a trial.

The CHAIRMAN tendered the thanks of the meeting to Mr. Kennett for having exhibited such beautiful prints obtained by his gelatino-pellicle, and to Colonel Wortley for the useful paper he had just read.

A letter from Mr. William Brook was then read, in which he described how he had recently exposed a Hill Norris dry plate that had been prepared fifteen years ago and had developed a good negative, a print from which was exhibited. The exposure given was twenty-five minutes.

Mr. Warnerke then read a paper *On a New System of Producing Large Panoramic Negatives in the Camera.* This method has been already described in an editorial article three weeks back, but Mr. Warnerke's paper will appear in our next number.

The CHAIRMAN spoke of the high degree of perfection to which Mr. Warnerke had brought the junction of the negatives, which, he observed, it was quite impossible to detect. One of these negatives (he said) embraced an angle of no less than 300°, or five-sixths of the entire circle.

A communication from Captain Waterhouse *On Some New Facts in Support of Dr. Vogel's Colour Theory* was next submitted and taken as read. This will eventually be published.

The thanks of the Society were conveyed to Mr. Brook, Mr. Warnerke, and Captain Waterhouse, and it was announced that the Society's exhibition would be opened on the 8th September. The proceedings then terminated.

SOUTH LONDON PHOTOGRAPHIC SOCIETY.

THE concluding meeting for the session of this Society was held on the 8th instant,—Mr. John Spiller, F.C.S., occupying the chair.

Mr. Henry Abenheim was elected a member of the Society.

A large and very fine collection of carbon prints by the chromotype process, by the Autotype Company and others, was exhibited by Mr. Foxlee. These were examined with interest by the members and elicited much admiration.

Mr. William Brooks then read a paper entitled *Further Experience with Collocine.* [See page 280.]

The CHAIRMAN observed that in the paper they had just heard read there was room for a difference of opinion. He saw that a preference was shown for a proto-nitrate of iron developer rather than for one of green vitriol. In 1853 the Rev. Mr. Sisson introduced nitrate of iron* as a developer, formed by the admixture of nitrate of lead and protosulphate of iron, the insoluble sulphate of lead formed by the decomposition having had to be removed by filtration. A little later it struck him (the Chairman) that this was a somewhat roundabout method of proceeding, and that the addition of ordinary saltpetre would answer equally well; experience confirmed this. It must be borne in mind that there was also present in solution the sulphate of potassium as well as the nitrate of iron arising from the reaction, but this did not exercise any hurtful influence.

Mr. F. YORK was at variance with Mr. Brooks in the estimate entertained of the developer. He exhibited a picture one half of which had been developed by the ordinary acetic acid developer and the other half by the new one, and he observed that the former was superior to the latter. He was not alone in this experience, for two other gentlemen (Mr. Day and Mr. King) had experienced the same; nor had he confined himself to one sample of collocine, as he had tried three different samples. He found, however, that when a minute portion was mixed with the ordinary developer it acted beneficially, giving clean pictures.

Mr. W. T. WILKINSON had been using the developer ever since it was introduced, and found it superior to anything they had yet tried. They used it in a form more diluted than that recommended by Mr. Brooks.

A general conversation here ensued concerning the precipitation that took place in the developer prepared with collocine, in which various members gave their experience.

Mr. COWAN found that the developer acted so cleanly and so well, giving such excellent negatives without shortening the exposure, that he should not like to go back to the old system of developing. With regard to the precipitate that took place, it was filtered out day after day, if requisite, without producing any weakening effect in the developer.

Mr. L. WARNERKE'S experience continued to be favourable. He found that the developer improved by keeping.

Mr. F. W. HART had had large experience with it. Foreseeing that photographers were likely to add too much he manufactured the article so that any slight error in mixing should be a minimum. As a general rule those who tried it liked it very much.

Some conversation here ensued respecting the effect likely to be produced by the use of pure or common sulphate of iron and of weak sulphuric acid, and the probable influence that might be exercised by the presence of the sulphate of zinc in the developer.

Mr. BURTON believed that sulphate of zinc had a great deal to do with the effect produced, and intended making special experiments to decide the point. In using the collo-developer he noticed that the image flashed out very quickly, although the shadows came slowly and gave great delicacy.

Mr. PEARSALL observed that the protosalts of iron were, when pure, of a light blue colour, and that the persalts were uncrystallisable. Some years ago the sesqui-oxide of iron had been frequently spoken of for medical purposes; now, as the ordinary sulphate of iron was distinguished for being green, it was a fair presumption that this contained another oxide—the sesqui- or the dent-oxide of iron, and he thought attention to these states of iron would do much to reconcile differences in practice of practical men.

After some remarks and a vote of thanks to Mr. Brooks the subject terminated.

Mr. Warnerke exhibited a number of panoramic views taken by means of his roller dark slide. An article on this subject has already appeared in a recent number of this Journal.

Mr. Aldridge then read a paper on *Obstacles to Photographic Progress.* [See page 281.] Owing to the lateness of the hour the discussion on the paper was deferred till a future meeting.

After the transaction of some private business the proceedings terminated.

EDINBURGH PHOTOGRAPHIC SOCIETY.

AN ordinary meeting of this Society was held in the Hall, 5, St. Andrew-square, on the evening of Wednesday, the 7th instant,—the President, Dr. Thomson, in the chair.

The minutes of previous ordinary and outdoor meetings were read and approved, and Mr. R. H. Bow, C.E., read a paper on *Small Scale Maps for Tourists.* [See page 282.] The paper was illustrated by a large number of specimens of various degrees of reduction, both by direct photography and by various photo-mechanical processes.

The CHAIRMAN said that he had often experienced the difficulties described by Mr. Bow in consulting the ordinary folding tourists' maps, and was certain that if accurate and legible reductions were introduced commercially they would become popular. In producing the reduced negative it was a question of much importance how best to secure sufficient density with the necessary clearness of lines. In enlarging, the amount of light on the object being copied was spread over the whole of the surface to be impressed, and was, consequently, feebler in proportion to the extent of enlargement; while, in reducing, the light was intensified in the same proportion. In this way it was not so difficult to get an intense negative; and in his own practice, when his bath and collodion were in the best order, he often got sufficient intensity by simple iron development. When that failed he always succeeded by preparing a beer and albumen plate in the ordinary way, and exposing it while wet. In that way perfect opacity was readily obtained, although it was sometimes necessary to clear the lines by a slight wash with a solution of iodine in potassium iodide, followed by a wash of weak potassium cyanide. He would be glad if those members who had much experience in that kind of work would state the best way to get satisfactory negatives of printed matter.

Mr. W. H. DAVIES remarked that in his day he had done a good deal of the kind of work referred to, and the result of his experience was that intensification with pyrogallic acid and silver was of no use. The aim of the photographer should be to get an even but solid deposit of metallic silver, and then to change the colour of that by mercury and ammonium sulphide, Schlippe's salt, or other of the well-known methods.

Mr. PRINGLE said Mr. Bow had started a question of much interest to photographers far beyond that of the reduction of maps. The preparation of small negatives for enlargement was becoming daily a more and more important branch of photographic business, and, while one professional enlarger wanted thin negatives full of detail, another, in equally extensive practice, said they should be developed up to full printing density. In the latter case he thought it not unlikely that, as so well shown by Mr. Bow, some of the finer lines and much of the delicate half-tone might be sacrificed.

Mr. TURNBULL remarked that for line work perfect clearness of the blacks was essential, but that he had never found much difficulty in producing good results. A thick collodion and a weak developer were necessary, and the exposure must be short. The developer should be washed off as soon as the image was well out, and the deposit blackened by a wash of bichloride of mercury, followed by a wash of sulphide of ammonium. If, after the iron has been removed, and previous to the application of the mercury, the image be too thin, it may be intensified with pyrogallic acid to which has been added a much larger than usual proportion of silver; that should, however, be only allowed to act for a short time, or filling up of the finer lines would be the result.

Mr. MOFFAT, in reply to a question by the President, said he had not done much in reductions, but that in ordinary copies from manuscript he had found the most successful way was to give a short exposure and trust to the action of mercury for sufficient intensity.

Mr. ROSS thought that the general tone of the discussion showed that ordinary wet collodion was apt to give obscured fine lines in the kind of work recommended in Mr. Bow's paper, and suggested the use of dry albumen plates as likely to give a finer deposit.

Dr. JOHN NICOL agreed with Mr. Ross in thinking that a dry film was more likely to answer the desired purpose than a wet one. He recently had occasion to make a microscopic observation of a number of films, the result of which proved what had long been said—that that produced on a collodio-bromide emulsion plate by alkaline development was finer than by any other process, gelatine perhaps excepted, and appeared under a high power simply as a stain. On such a film, especially if the bromide were slightly in excess, any amount of density could readily be got, and therefore he thought a collodio-bromide emulsion would answer admirably.

Mr. TURNBULL had heard the same claim made on behalf of collodio-bromide before, but he thought it could hardly be sustained. He had recently tried it, as well as beer and albumen and wet collodion films under the microscope, and could see no difference between any of them.

A number of pictures were then handed round by the Chairman, Mr. Sinclair, Mr. Panton, Mr. Crichton, Dr. Nicol, &c., principally the results of the last outdoor meeting, most of which were much admired. After a vote of thanks to Mr. Bow, the meeting was adjourned for a fortnight, when the Council will present their report regarding the forthcoming exhibition.

Correspondence.

DRYING PLATES.

To the EDITORS.

GENTLEMEN,—Seeing your article in this week's Journal respecting the drying of plates over sulphuric acid I beg to add my testimony to that of Mr. M. Carey Lea, having used a capsule filled with that acid at the bottom of my drying-box for many years with the best results.

However, instead of attributing any bad result to the formation of hydrogen in the box, I believe it will be found to be caused by using common oil of vitriol instead of pure sulphuric acid, the former nearly always giving off nitrous fumes, whereas the latter is quite free. It can be procured easily in all large towns.—I am, yours, &c.,

14, *Commercial-street, Leeds, June* 12, 1876. G. D. SCORAH.

* We imagine that Mr. Spiller is scarcely correct here; for, unless we are much mistaken, the nitrate of iron developer was due to Dr. Diamond, who formed it by means of nitrate of baryta added to the solution of protosulphate of iron. It is quite true that Mr. Sisson did, in 1853, suggest its preparation in the way mentioned, but this was *after* its introduction by Dr. Diamond.—EDS.

"THE DRYING OF GELATINO-BROMIDE PELLICLE."

To the Editors.

Gentlemen,—I have noticed in your last week's issue a communication from Mr. M. Carey Lea in answer to my query on page 178, and in reply I wish to say that my sulphuric acid did come in contact with the perforated zinc and iron plate at the bottom of the box through the breaking of the dish in which it was placed, and so confirmed the conclusion arrived at by Mr. Lea.

I regret I did not state the circumstances more fully, as I should then have saved Mr. Lea the trouble of further investigation. Thanking him for his reply,—I am, yours, &c., Gelatino-Bromide.

44, *Dalton-street, Hulme, Manchester, June* 13, 1876.

P.S.—Seeing that there is great importance attached to the drying of gelatine plates as soon after coating as possible, I am sure that if Mr. H. B. Berkeley, "Franklin," "L. S. D.," or any other worker of this process would give their method it would be gratefully received by many.—G.-B.

CANON BEECHEY'S PROCESS.

To the Editors.

Gentlemen,—It may be useful to some of your amateur readers who, like myself, are anxious to work some dry process, if I describe my success with Canon Beechey's beer plates. After trying two of the commercial emulsions without success, and two commercial pellicles with a like result, I am so pleased with the simple plates of Canon Beechey that I can most confidently advise others to try them.

My first batch worked well enough to make me satisfied that I had at last got hold of a good thing, and my second and third lots have quite confirmed that idea.

By carefully adhering to the formula published in this year's Almanac for the preparation of the emulsion, using Burton bitter beer with one-sixth of methylated spirit added and a grain to the ounce of pyro., no one can, I think, go wrong. The plates come up usually quite dense enough, but if from over-exposure they are a *little* lacking in that desirable quality, they will easily intensify after fixing by the use of the usual pyro. and silver, giving them *first* a dash with this, washing off, and *then* flooding with weak iodine. Then you can go on with the silver as long as you like.—I am, yours, &c., C. H. F. C.

The Vicarage, Blandford, Dorset,
June 12, 1876.

PIGMENT PRINTING.

To the Editors.

Gentlemen,—In your last issue I observed a quotation from a work recently published by the Autotype Company, which recals the fact that no answer has been given to a question of mine in a former letter, and I trust that the importance of the subject will excuse me if I refer to it again.

The pamphlet on carbon printing states in effect that "all the range of photographic tints produced by gold toning can be obtained in pigment prints and of undoubted permanency." It also affirms that "an exaggerated brilliancy can only be produced at present by means of cochineal colour."

The question, then, which interests photographers so much to know is—which of the portrait tissues (having the colour of a gold-toned print) issued by the Company do they assert to be made with pigments of undoubted permanency and, of course, without cochineal colour.—I am, yours, &c., Examiner.

June 12, 1876.

TRADE PUFFERY.

To the Editors.

Gentlemen,—I feel myself almost in the position of the historical brigade, who were "stormed with shot and shell;" for my last paper at the South London Photographic Society has elicited more observations of an antagonistic, although happily not of an unfriendly, kind than falls to the lot of the average papers.

The "Peripatetic Photographer," among others, falls foul of me for not having converted my paper into a practical manual of carbon printing, for this, after all, is what his criticisms amount too; and because I not only did not do so, but also illustrated my observations by the exhibition of specimens from the only establishment in this country where such specimens are produced, and with which I happen to be connected in business, he hurls at me from his big gun such a bomb-shell as "trade puffery." Were I to say a word by way of refutation of this I would be acting a part so unwise as to make me deserving of his censure. Had the "Peripatetic Photographer" been present at the meeting in question he would have seen that his imputation was not shared by a single member present.

Permit me to inform the "Peripatetic Photographer" and the other readers of my paper that the Autotype Company do not produce transparencies for the public; but they do better—for they put the public in a position to produce the transparencies for themselves, and by attention to the instructions given they (the public) may produce them equal to the specimens I exhibited. To prove that this is the case I offered at the meeting of the South London Photographic Society to produce before them transparencies at a subsequent meeting, adhering in doing so to the literal instructions published by the Company.

With respect to the intensification of transparencies: I exhibited a specimen at the desire of Mr. H. T. Burton for the sole purpose of refuting a statement made by Dr. Vogel, to the effect that carbon transparencies could not be intensified; but, being in a hurry to reach the meeting in time, I omitted to obtain from Mr. Burton the formula by which it had been intensified, and which would have been cheerfully given.

I here ask Mr. "Peripatetic Photographer" where is now the "puffery?" His inuendo indicates a cynical disposition which could only be indulged in by one who is totally ignorant both of the geniality that characterises the meetings of the South London Photographic Society, and also of myself; for in hinting, as he does, that I could be capable of taking advantage of my position as a member of the Committee to advertise my employers—who are content to depend upon success legitimately obtained by the merits of their productions—he only shows himself to be behind the times. Let him for the future put in an appearance at the South London Photographic Society's meetings, and I venture to assert that he will be largely benefited, and have his misconceptions entirely rectified.—I am, yours, &c., W. T. Wilkinson.

June 6, 1876.

Miscellanea.

The Photographic Society of Victoria.—We are gratified by hearing of the formation of a society at the Antipodes, the Photographic Society of Victoria being the result of the energy displayed by several gentlemen in Melbourne. It already possesses the goodly number of fifty professional and a large sprinkling of amateur photographers. We trust that success will attend the new Society, and we shall be glad to publish its transactions.

Patent Discussions.—The Photographic Society of France has wisely decided upon abstaining from entering into discussions of patents and claims of rights. M. Davanne observed that such discussions forced personal questions on the attention of the Society that would lead to trouble and discord in their meetings, and hinder general communications and the progress that the Society had hitherto enjoyed. This decision was *apropos* of the receipt of a letter from M. Ducos du Hauron, which, it was expected, would give rise to much discussion.

Vanadium—A New Photographic Agent.—Professor H. E. Roscoe, F.R.S., of Owen's College, Manchester, at the evening meeting of the Royal Institution, on Friday, June 2, gave an account of the results of his recent investigations into the properties of the rare metal vanadium, in continuation of his discourse on February 14, 1868, of which we (*Illustrated London News*) gave a notice in our number for February 22, page 194. This metal, discovered in certain iron ores by Sefström, a Swedish chemist, in 1830, is named after Vanadis, a cognomen of Freia, the Scandinavian Venus. It was specially studied by Berzelius, who corroborated Sefström's statement that its characteristic feature is an acid-forming oxide, termed "vanadic acid," and discovered other oxides and a volatile chloride. The price of vanadium, £35 the ounce, excluded it from ordinary investigations, till, in 1865, Professor Roscoe obtained a supply, having discovered it in the copper-bearing beds of the lower keuper sandstone of the lower trias at Alderley Edge, Cheshire. He proved, in 1868, that the vanadium of Berzelius is an oxide, not a metal; and determined the atomic weight, from a compound with nitrogen, to be fourteen parts by weight of nitrogen to 51·3 of vanadium; and also proved it to possess close analogies with phosphorus and arsenic, being one of the trivalent group of elements. It has since been ascertained that vanadium has poisonous effects upon the animal system resembling those of phosphorus and arsenic; and that vanadic, like phosphoric, acid has three series of salts—ortho-, meta-, and pyro-vanadates—which differ from the phosphates in the order of their stability. Of these the ortho-vanadates were described as highly sensitive to the action of light, and therefore available for photography, of which the Professor exhibited examples. Vanadium, he said, may also become valuable in dyeing. In manufacturing aniline black powerful oxidising agents and high temperatures are required, which tend to destroy the fabric died. The Professor stated that the oxidising power of vanadium very greatly exceeds that of the salts of copper usually employed, and that the aniline black produced by it is permanent; whereas that produced by copper is liable to turn green. Vanadium oxide has already been employed in making marking-ink, seven to twelve grains of the salt being sufficient to produce a gallon of ink, and sixteen grains, costing one penny a grain, are sufficient to print 500 yards of calico. Thus an element which for a long time was only a chemical curiosity has furnished another example of the great importance of original scientific research. The discourse was fully illustrated by experiments and diagrams.

EXCHANGE COLUMN.

No charge is made for inserting these announcements; but in no case do we insert any article merely *offered for sale*, that being done at the small cost of one shilling in our advertising pages. This portion of our columns is devoted to exchanges only. It is imperative that the name of the person proposing the exchange be given (although not necessarily for publication, if a *nom de plume* be thought desirable), otherwise the notice will not appear.

Rapid cabinet portrait lens wanted in exchange for bellows-body camera, for plates 6½ × 6½, and *carte* camera and lens; also case of six Twaddell hydrometers and four others.—Address, A. McSurney, 25, Warwick-lane, E.C.

A rosewood angle show-case for door, having about 9 feet super-exhibition space; also, frame on rollers for supporting movable background, in exchange for accessories, &c.—Address, H. S., 5, Hanover-place, Park-road, Regent's-park, W.

ANSWERS TO CORRESPONDENTS.

Photographs Registered—

Patterson and James, Ramsey, Isle of Man.—*Four Views of Dhoon Glen Falls.*

John Owen, Newtown, North Wales.—*Four Portraits of Sir W. W. Wynn, M.P.*

☞ *Correspondents should never write on both sides of the paper.*

Notice.—Each correspondent is required to enclose his name and address, although not necessarily for publication. Communications may, when thought desirable, appear under a *nom de plume* as hitherto, or, by preference, under three letters of the alphabet. Such signatures as "Constant Reader," "Subscriber," &c., should be avoided. Correspondents not conforming to this rule will therefore understand the reason for the omission of their communications.

⁂ We regret to have again to apologise to several contributors whose communications we have had at the last moment to leave over owing to press of matter.

C. L. Pond (Buffalo, U.S.A.).—Remittance duly received. Thanks. The Almanac will be forwarded.

F. P. L.—We have tried a substratum of the kind described since the receipt of your letter, but we did not experience the special defects to which you make reference.

Maxwell Jackson.—Probably the best way to proceed is to dissolve the nitrate of silver in alcohol heated in a test tube, the crystals having been previously pulverised.

P. L. S.—So far as we know the retouching-frame in use at present is a foreign invention. M. Reutlinger, of Paris, was amongst the first who wrote a description of this apparatus.

J. R. Fisher.—When the number of plates exceeds six the changing-box will be found to excel the double dark slides in convenience; but for any number short of this the slides will prove the more advantageous.

Subaltern.—To discover whether the plate is sensitised with an iodide or a bromide pour upon it a little liquor ammonia. If the material be bromide of silver it will be dissolved by the ammonia, but if it be iodide no such effect will be produced.

Tyro.—Bromide of potassium was suggested for the paper negative process many years ago. It also formed the salting substance employed by Sir W. J. Newton, in his process for printing positives by development, more than twenty years since.

L. B. Watson asks what is our opinion of "cameo vignette" *cartes.*——In reply: we consider them quite unsuitable for placing in an album, for, owing to the convexity of the surface they get rapidly destroyed by abrasion arising from contact with the opposite picture.

Capt. Gubbins.—Assuming that a considerable period has elapsed since your letter was written, we believe that in the communication of Mr. Brooks, made to the South London Photographic Society, which you will have since seen, will be found such hints as will meet your difficulty.

B. Baxter.—For your purpose thin Saxe paper is by far the best that could be adopted. Should you find it desirable to remove the size, immerse it for a brief period in a vessel of hydrochloric acid, taking the precaution of seeing that it is properly washed afterwards. This will entirely denude it of its size.

Photo-Enamel.—Although we have received full particulars of Mr. A. L. Henderson's enamel process from that gentleman, and have had the further advantage of seeing the process worked by him, we are not yet in a position to publish the details, seeing that the patent has not yet been sealed. When this event takes place—which, we expect, will be in a fortnight—we shall be at liberty to fulfil our promise of publishing full particulars.

Oxonian.—The untoned patches on the prints appear to have been caused by too many proofs having been placed in the toning bath, and air-bubbles getting between them. Frequently, too, the contact of one print with another produces effects similar to some of those apparent in your specimens. The remedy for such defects consists in the immersion of a smaller number of prints in the toning-bath, and ensuring the solution coming in contact with every part of each print.

Quercus (Leeds).—If you had read the article with a greater amount of care than you appear to have done it would be found that the term "fluorescence" does not once occur. By "fluorescence" is meant the property possessed by certain solid and liquid bodies of changing invisible rays of high refrangibility into visible rays of lower refrangibility, which is quite a different matter from the "polarisation" of light.

C. P. suggests that advantage might reasonably be expected to accrue if a specially-prepared pigment tissue of an orange colour were used for the purpose of obtaining a transparency from a weak negative which was found difficult of intensification, and he imagines that from this transparency a dense negative might be obtained. If we mistake not, coloured tissue of the kind suggested by our correspondent was extensively employed by M. Lambert in his chromotype process.

J. Richards.—The dark matter round the cork and mouth of your bottle of ammonia-nitrate of silver is not fulminating silver as you imagine; hence the cork may be removed and the mouth of the bottle wiped with perfect safety. As we have several times had queries put to us similar to that which elicits the above reply, we here take occasion to observe that fulminating silver is only formed when oxide of silver is digested in ammonia for several hours—usually one day. The black powder in the bottle is the fulminate. Now, as ammonia-nitrate of silver is merely a solution of oxide of silver in nitrate of ammonia, it will be seen that the two substances are different.

T. T. M. S.—To obtain an enlargement a copying camera is not necessary in the production of the intermediate transparency. It is only necessary that the small negative be placed against a bright and uniform light, and the lens of the camera be then directed towards it. While it is desirable that the space between the lens and the negative thus lighted be enclosed it is not at all necessary. A prolonged hood in front of the lens, with a square aperture in the outer end of the hood, will answer every purpose. The distance at which the lens must be placed from the negative depends altogether upon the degree of amplification or diminution of which the transparency is required, taken in connection with the focus of the lens. Full particulars on these subjects will be found in a carefully-compiled table of enlargements which for many years has formed part of the "standing matter" in our Almanacs.

The Collo-Developer.—In a note received from Mr. F. York, since the last meeting of the South London Photographic Society, reported in another page, that gentleman observes:—"It is odd that my experience with the collo-developer is so opposed to nearly all who have tried it. I have renewed my experiments, and find that I cannot get half as good results as with acetic acid in landscape work. I copied a picture on Saturday and got good results, but in outside work I cannot succeed. I am making a fresh lot, and, instead of neutralising it with zinc, I intend boiling the acid and gelatine for the time named, then dilute it to the proportion of one in ten of water adding marble to neutralise instead of zinc, the same as I have always done with chloride of gold. This will do away with the objectionable effervescence which requires so much care to keep the contents in the flask. Sulphate of zinc may be added to the developer if it be found advantageous."——We trust that Mr. York's intelligent perseverance will eventually meet with its reward in discovering the best conditions under which success with this developer may be achieved.

☞ **Editorial Communications should be addressed to "THE EDITORS"—Advertisements and Business Letters to "THE PUBLISHER"—at the Offices, 2, York-Street, Covent Garden, London, W.C.**

LONDON GAZETTE, *Friday, June* 9, 1876.

Partnerships Dissolved.

J. Dorre and J. Woolley, Baker-street, Portman-square, photographic artists.

METEOROLOGICAL REPORT,

For the Week ending June 14, 1876.

Observations taken at 406, Strand, by J. H. Steward, Optician.

These Observations are Taken at 8 a.m.

June.	Bar.	Wind.	Wet Bulb.	Dry Bulb.	Max. Tem.	Min. Tem.	Remarks
8	29·94	W	52	58	66	49	Cloudy
9	29·73	NE	50	53	60	51	Dull
10	30·13	NE	49	55	61	51	Cloudy
12	30·07	NW	58	65	81	51	Hazy
13	30·05	N	54	60	67	60	Raining
14	30·07	W	53	58	—	51	Fine

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THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 842. Vol. XXIII.—JUNE 23, 1876.

SOME FURTHER EXPERIMENTS WITH PRESERVATIVES.

In continuing the course of experiments that led to the recommendation of an infusion of hops and albumen, published at page 279 of our last week's number, we have been impressed with a fact which, although not new, has been to a large extent forgotten and neglected, namely, that with very few exceptions the preservatives in general use may not only be removed from the film with impunity, but in every case with very decided advantage.

We have no doubt most of our readers will remember the impetus given to dry-plate work by the introduction of what was for a considerable time largely practised and known as the Fothergill process, which was simply the application of dilute albumen to a washed collodion film, and the subsequent thorough removal by prolonged washing of the solution of albumen. It is true that many operators laid much stress on the necessity for leaving a certain portion of silver in the washed film previous to the application of the preservative, and much discussion took place as to the number of washings to which the plates should be subjected, and even to the number of drachms of water which ought to be used for any particular size; but the outstanding fact, which made the process different from those which had preceded it, was that the preservative, after being allowed to do its work, was as far as possible removed by copious washing.

The fact that plates from which the preservative had been removed were more sensitive than those on which it remained was abundantly proved by experiment and generally admitted, but we do not remember that any attempt—or, at least, any successful attempt—was made at an explanation of the cause. The impetus thus given to dry-plate work brought large numbers into the field, and as, by-and-by, it was found that almost any soluble organic matter might be used as a preservative, amateurs were more eager to discover a "new process" than to seek to understand the theory on which the system was based; hence, in the host of substances that were recommended—each heralded as better than all that had previously been used—the important truth that they might with much benefit be washed off after they had done their work seemed altogether forgotten.

Recent research into the nature and properties of dry films has thrown much light on what was at the time to which we allude very obscure, and, although there undoubtedly yet remains much to be discovered, we think we are in a position, to a certain extent at least, to account for the more sensitive nature of the washed film. Tannin, beer, and gelatine may be taken as types of the preservatives—or perhaps "organifiers" is a better title—as we are under the impression that the great majority of the substances that have been recommended owe their action to properties possessed in common with one or other of these types. Now it is well known that, although these bodies are entitled more or less to be classed as reducing agents, they nevertheless, when added to the ordinary developer, act as powerful restrainers. It has been more than once attempted to distinguish between a "fog restrainer" and a restrainer of actinic action; but the fact remains that, if a plate which has received an exposure of say ten seconds can with an ordinary developer be developed into a good printing negative, a much longer exposure will be required if a few drops of beer or solution of gelatine have been added to the developer. The effect of beer in the developer is, we are aware, largely taken advantage of, some operators substituting it altogether for acetic acid; and especially in line work for photolithography is it found useful, as it promotes the formation of the hard white and black so necessary in that kind of work. The restraining action of beer is also well known to those who work the plates made according to the directions given by Mr. W. H. Davies or Captain Abney, or the emulsion plates prepared according to Canon Beechey's formula—all of which may be developed quite free from fog by alkaline pyro. without addition of a bromide.

If, then, it be admitted that the presence of certain organic matters not only retards development, but necessitates a longer exposure, the method of allowing such matter to remain on the film must be at least questionable, and the inquiry whether it can with safety be removed should be answered. Photographers, like other men, are very much creatures of circumstances, and it is possible that the unfortunate title "preservative" has something to do with the question having been so long almost neglected, seeming, as it does, to convey the idea of a protecting coat or varnish. It has recently been suggested that silver bromide may in some way enter into a union, or be modified at the time of its formation by contact, with organic matter; and, while this may be true, we think it equally likely that both silver bromide and silver iodide may be so acted upon *after* they have been formed in the film, and that as soon as the change, whatever it may be, has been effected the organic matter should be removed as not only useless but actually injurious.

Acting on this impression we last week prepared a number of plates, both in the bath and from a variety of emulsions, and subjected them to the action of most of the organifiers that have been in general use. In each case the preservative was allowed to dry on some of the plates, and thoroughly washed off from others. Each pair were exposed under as nearly as possible identical circumstances, and developed with all the care and experience we could bring to bear on the operation, the result being in every case more rapid development and very much more delicate detail in the washed plates than in those on which the organifier had been allowed to dry; but while in all cases there was an evident gain, the degree differed considerably in the various substances. Coffee, dextrine, and hops seemed to gain least, while beer and tannin were most benefited; in fact, in one sample, where a very strong ale had been used, a better negative was got on the washed plate with exactly half the exposure than had been required for that on which the ale had been left.

There is one peculiarity of the washed films which we must not omit to mention. We have hitherto had a *penchant* for plates that dried with a brilliant lustre, and were not a little disappointed to notice that the washed films were much less brilliant than those unwashed. This was especially the case with the beer organifier, most of the plates having a perfectly matt surface. On development, however, we had ample evidence that the absence of gloss was no draw-

back to the plates, and one negative—the most brilliant and best of the whole series—was, previous to development, the most dim and apparently unsatisfactory of the entire batch.

LANDSCAPE WORK CONSIDERED FROM AN ARTISTIC POINT OF VIEW.

It is no unusual occurrence to hear the question asked by photographers projecting a trip with the camera—"Where shall I find the most suitable scenery for photographic subjects?" Now, to those whose time is limited—the case, unfortunately, with the majority of amateurs—and who are at the same time unacquainted with the physical features of the usual resorts of the searchers after the picturesque, the question presents a difficulty not to be surmounted in a haphazard or offhand way; for the few days which such persons are able to snatch annually from the ordinary routine of more serious matters form frequently the only time which they are able to devote to the business of picture-taking as distinguished from what they probably consider the drudgery—that is, the experimental branches—of photography. If, therefore, owing to an injudicious choice of ground, the supply of picturesque subjects fall short of their expectations, disappointment ensues, another year must elapse ere the experiment can be repeated, and then, perhaps, with a like result.

Surely it may be argued there is sufficient picturesque scenery even in our own "tight little island," without going farther from home, to satisfy the cravings of the most ardent landscapist, and that from guide-books and other sources the fullest information may be obtained; so that the intending traveller can, without leaving his own fireside, become thoroughly acquainted with any place of note in this country or on the continent, or even, at the present day, in the world. This may, in a sense, be perfectly true; but it must be borne in mind that guide-books are too apt to clothe their descriptions of places and things in language calculated to leave too exalted an impression upon the mind of the reader, who is proportionately disappointed upon finding himself face to face with the bare reality. Travelled friends—especially if they be non-photographic ones—also manage, in pure inadvertence, to raise a false picture, for, however fine the scenery may be, it by no means follows as a matter of course that it is suitable for reproduction by means of photography; and, even granting that it is so suited, it is quite possible that the photographer may lack the discriminating taste requisite in selecting his subjects. We do not here refer so much to artistic taste in the choice of the point of view and "composing" the picture, but rather to that more technical quality which enables an experienced photographer to discriminate between those subjects which may be photographed without losing the charm of effect and those, again, which present but a sorry mass of outline and detail, lacking both spirit and beauty.

We meet, unfortunately, with many—sadly too many—such productions in nearly every collection of photographs we turn over, and can only attribute them to the inability of the photographer to thoroughly realise the fact that he is working in monochrome and not in colour. Many are the subjects which, to the eye, present the most perfect combinations of beauty, but whose sole charm lies in the rich contrasts of colour in foliage and under-growth or time-worn and moss-grown rocks and stones; but of what value are such to the photographer whose dependence is placed upon picturesqueness of form, combined with play of light and shade, in contradistinction to colour? Here our friend the artist has the advantage; for, though deficient in the power possessed by the photographer of producing minute detail, he is able, by a single skilfully-disposed touch of the brush, to produce such a *suggestion* of detail that, backed as it is by the charm of colour, places a painting in the front rank of pictorial work.

But there is another point of difference between the productions of the photographer and those of the artist in colours. The former, upon fixing the direction of his projected tour, in all probability sets to work straightway and maps himself out a course to be adhered to day by day. The consequence is that, in order to keep to his programme, he is obliged to hurry from place to place, with barely sufficient time to stay and photograph the objects of interest on the the direct line of route, and those only from the *usual* standpoint, with but little consideration of the question as to whether the light is suitable to the subject. Hence it is that the portfolios of so many of our amateurs are but a repetition one of another—all containing the same hackneyed subjects, taken from the same points of view, apparently for the sole reason that the subject is a well-known one, and would perhaps fail to be recognised if taken from a new point of view. Our picture may be considered an exaggerated one; but we call upon anyone possessing acquaintance with amateur photographers—or for that matter, but not to the same extent, with professionals—to bear us out in the truth of our remarks. There are, we are happy to say, exceptions; but we should like to see the exception become the rule.

Turning to the work of the painter: though on looking over the landscape work in the exhibitions we may find in successive years numerous specimens of *Snowdon, from Capel Curig, Skiddaw*, *Ben Nevis*, or any other equally well-known subject, they receive such a variety of treatment as to leave no feeling of sameness upon the mind. We remember, a few years back, inspecting a collection of the works of a well known water-colour painter, and amongst the number were no fewer than nine pictures of one particular subject—a very favourite one not only with artists but also with photographers—and had we not been well acquainted with the spot we should scarcely have noticed the repetition, so various were the styles in which it was treated. In this respect the wielder of the brush has a scope which is denied to a great extent to him of the camera, yet the latter has sufficient opportunity for the exercise of taste to keep him clear of the dead level of uniformity which now exists. But, in order to succeed, it behoves him to put aside the idea of turning out the greatest quantity of work in the shortest space of time, and to aspire rather to the production of fewer pictures, but these bearing evidence of care and thought.

We have had the opportunity of mixing a good deal with landscape painters while at work, and a consideration of their habits and practice enables us to state that it is not the worker against time who produces the best work, nor are the finest subjects to be found on the highways or at those points where tourists and sightseers "most do congregate." On the contrary, most landscape artists have some other occupation or hobby with which to amuse themselves or while away the time when outside conditions are unfavourable to them, or the desired effect they wish to secure is not to be obtained; and during their wanderings in search of the "gentle trout," botanical or other specimens, they find endless opportunities of noting down for future use picturesque "bits" in spots far removed from the track of the ordinary tourist. Why then should the photographer, with far greater obstacles in his way in the production of artistic work, attempt to perform what the educated taste of the real artist teaches him is impossible?

It is not possible for anyone, be he ever so competent, to lay down rules on a matter of this description, and, were it otherwise, we should scarcely choose to attempt it; but we think that amateur photographers may well take to heart and consider intelligently the remarks we have made. We have spent many a pleasant hour scrambling over the rocks in the bed of some mountain stream, either with the camera or, if the weather were not propitious, with the rod, or following the sheep-tracks, or no tracks at all, over the mountains themselves; and, even at the end of a "blank day," have scarcely considered the time altogether ill spent. Better, we think, to lapse into pure idleness than to waste time in the production of bad or inferior work.

THE PRINCE OF WALES' INDIAN COLLECTION.

Having been favoured with an invitation to a private view of the Prince of Wales' Indian Collection, which was opened to the public yesterday at the India Museum, South Kensington, we had much pleasure in making a quiet inspection of the extensive and magnificent assemblage of oriental art which is there displayed.

There are two cases devoted to plain and painted photographs. Bourne and Shepherd are the chief contributors, and very excellent work they have produced. There are also some good portraits by J. Craddock and R. Ritter and Co. The painted works are clean, smooth, hard, and waxy, and, as might be expected in the case of oriental art, they are more successful in the ornamental details than in the vital painting of the heads.

A few other photographs are on the walls. Especially noteworthy is a fine life-size head of the Maharajah of Jeypore, worked up in Indian ink, also a good head of the Ameer of Cabul and some groups tinted in water-colour.

A large glass case of photographic albums is wisely protected from the profane touch of the vulgar; therefore, as we could only view them from the outside, we epitomise by saying that they are gorgeous beyond description.

Probably many may consider the highly-artistic and spirited sketches by Mr. Sydney P. Hall the most interesting feature of the exhibition. This artist was invited by the Prince to accompany him throughout the tour, and most successfully has he accomplished the arduous task which devolved upon him. The sketches exhibited are only a portion of those which he made during the royal progress. They are in oil, water-colour, pencil, &c. There is frequently a droll vein of humour running through these sketches—a tendency to drollery which the artist has had, perhaps, some difficulty in repressing.

The first sketch which caught our eye represents the Prince's progress through an Indian street. His Royal Highness, with hand upraised, is vainly endeavouring to protect his ear from a terrific blast of gigantic trumpets, tom-toms, and other instruments of musical torture. This sketch is powerfully executed in water-colour.

Then we notice a funny little pencil sketch called *The Triumph of Music*, representing McAlister, the Duke of Sutherland's piper, dancing the Highland fling on the body of a prostrate tiger to the "scream" of his own bagpipes—a modern Anglo-Indian-Caledonian rendering of the classic fable of Orpheus taming the tiger by the power of his lute.

A companion sketch is called *The Garb of Old Gaul in India*—a kilted gillie in the vicinity of some uncanny serpents. "It's nae the teegars that fear me, it's jist the sairpints an' the like o' thay."

But we advise our readers in town to see the collection for themselves. There are some paintings by native artists. Two life-size pictures, possessing some merit, are painted by Rama Varma Killimanour Kozil Tambouran, of Travancore.

RECENTLY PATENTED INVENTIONS.

No. XI.—HENDERSON'S ENAMEL PROCESS.

We are at length in a position to "speak out" with respect to the enamel process of Mr. A. L. Henderson, on which we three months ago published an article entitled *A Day with a Photo-Enameller*. We then stated that we were debarred from giving a full account of the whole *modus operandi*, because the process had been made the subject of a patent, which precluded our publishing details until the period of preliminary probation had expired and the great seal been secured. The patent having been completed all restriction is removed, and we are now at liberty to make due publication of the details.

In our previous article (March 10, 1876, page 110) we said:—"It is well known that enamel powder colours consist of a metallic oxide ground up intimately with a finely-powdered and fusible glass, the latter giving the body and glaze, while the former imparts the colour. The best description that we can give of Mr. Henderson's process is by saying that he deposits upon the primary silver image of a negative or transparency a substance precisely similar to this powder, by which a brilliant image is obtained, no after-fluxing being at all necessary." Bearing this in mind we now proceed to point out the manner in which the whole operation of producing an enamel is gone through, and we are enabled to do this from our having seen the operation conducted from begining to end, and also from our having now before us a copy of the completed, as well as the provisional, specification. From these sources of information, but chiefly from the specification, we proceed to give the following summarised account of the nature and scope of the invention.

Starting with a statement of its object—namely, the production of photographs in vitrifiable pigments, which may be burnt-in upon enamel tablets, glass, porcelain, metal, the colour of the surface being white, black, or other colour—Mr. Henderson says that in carrying his invention into effect he produces, first of all, either a negative or a transparency according to the colour of the enamel or other surface upon which the vitrifiable image is to be burnt. If it be white the transparency is treated with iodides, bromides, or fluorides—such as those of lead, platinum, iridium, manganese, cobalt, titanium, cadmium, mercury, antimony, copper, magnesium, iron, and silver—by floating or immersion. These iodides are combined with mordants, such as bichloride of tin or chlorides of any kind, sulphantimoniate of sodium, and alkaline or other sulphurets, with mordants and silicates which are applied previously, simultaneously, or subsequently to the treatment of the transparency with iodides or bromides.

Should the intensity of the picture be too great it may be reduced by nitric or hydrochloric acid or a mixture of both, or by any solvent of the iodides of the metal or of the metal itself of which the image is composed.

The picture may now, if preferred, be submitted to the action of silicates, such as those of sodium or potassium, the effect of which is to produce the deposited metal as a silicate, which requires no fluxing at the subsequent stage, this being a flux in itself, after which it is transferred to the enamel, which is then fired so as to vitrify the silicate, although the conversion may be effected after its being transferred.

The picture need not necessarily be transferred from one material to another, but may be taken direct upon the enamel. It may then either be left as it is or may be treated with fluoric acid, by which an intaglio is produced. This may be used as an engraved plate for printing, or may be filled up with enamel colour of any desired tint and again fired.

If it be not desirable to convert the image into a silicate, or if by accident this conversion have been imperfect, the picture may be fluxed by any of the well-known methods. Mr. Henderson prefers, however, the use of an emulsion, in which the solid matter is borate of lead, formed by mixing together acetate of lead and biborate of soda in their equivalent or combining proportions, the vehicle in which it is suspended being collodion, oil of spike, fat oil, or similar media. This is applied in the way well known to all enamellers.

If the enamel be black or dark a negative is applied instead of a transparency; but in this case, as the resulting picture must be light in various grades of tone, it must be treated with the iodides or bromides of such metals as will produce a light image, such as those of tin, antimony, arsenic, or any metal that yields a light deposit. The picture thus formed is treated in a similar manner to that already described.

The proportion required connected with any of the operations depend upon the length of time the image is subjected to their action, as well as on the tone or colour desired. The following is given as an example of an average working formula:—

Bichloride of platinum (or its compounds)	5 parts.
Bichloride of tin ,, ,,	30 ,,
Iodine	to saturation.
Acid (such as hydrochloric)	9·60 parts.
Silicate of potash	20 ,,
Acetate of lead	40 ,,
Water	8·000 ,,

The special claims made by Mr. Henderson are—

First.—The use of bromides and iodides separately or conjointly, used either with or without chlorides for the production of enamels.

Secondly.—The use of these bromides, iodides, and chlorides in conjunction with silicates, as described.

Thirdly.—The dissolving away of the vitrified image by means of fluoric acid and utilising the intaglio thus obtained either for printing from or for the production of another image, composed of the same or a different material, as described.

In our last week's issue we published two articles which, though treating of widely different topics, have one point in common which may form the text for a single discourse. We refer to Mr. Bow's article *On Small Scale Maps for Tourists*, and that of Mr. M. Carey Lea on *A New Method of Intensifying Collodio-Bromide Plates.* With regard to the former we may pass over the introductory portion, merely remarking that we have long recognised the advantages to be derived by the tourist, whether photographic or otherwise, from the use of the reduced maps recommended by Mr. Bow, who is deserving of the thanks of the travelling public for calling attention to the subject, and will proceed at once to the consideration of the particular matter which has arrested our attention, namely, the chemical difficulties in the way of reproducing the fine lines with sufficient clearness on a greatly-reduced scale. These difficulties, as the author demonstrates, are mainly, if not wholly, due to the tendency of the fine lines to fill up in the process of intensification; and this effect, whether it arise from the action of diffused light, blurring by reflection, internal irradiation, or similar causes, is met with in its most aggravated form when a method of intensifying is resorted to which depends for its efficacy upon the deposition of metallic silver upon the image by means of pyrogallol or other reducing agent. Obviously the best plan to adopt is one based upon the alteration of the colour of the deposit after fixation, when, provided the lines are then clear—an end by no means difficult of attainment if the development be not pushed in order to secure density in the earlier stage—it is scarcely possible by fair means to obscure the transparent portions of the negative, owing to the removal from the film by the fixing agent of any substance or influence which might give rise to abnormal development. We were sorry to notice in the report of the discussion which followed the reading of Mr. Bow's paper that one of the members present recommended the use of bichloride of mercury for the purpose of which we speak. Granting that extreme density is obtainable in that way, we think it has been fully shown that negatives so intensified are not to be relied upon on the score of stability. On the other hand, we are disposed to look favourably upon the suggestions of Mr. Ross and Dr. Nicol with reference to the use of dry plates, for the reason that, physically speaking, the thin and polished surface of a dry plate is better adapted to render extremely minute detail than the comparatively spongy film of wet collodion, even in face of the denial that dry films are superior in point of fineness of deposit to wet ones. But it happens, unfortunately, that the former—at least when prepared with bromide alone—are not, as Mr. Lea remarks in another column of the same number, so easily amenable to the action of the usual intensifying processes other than acid silver as are wet plates, or those containing iodide and developed in the first instance by the acid method. Mr. Lea, however, in the article referred to, describes a method specially adapted to the intensification of bromide plates developed with alkali, and which is quite free from the objections raised against pyro. and silver, inasmuch as it is incapable of forming a deposit where no deposit existed previously. This method is identical in principle with the one published by ourselves about twelve months ago, in which we recommended the treatment of the image after fixation with a solution of chloride of copper, and subsequently with alkaline pyro. Mr. Lea replaces the copper salt by using chloride of gold—otherwise the details are the same—and explains its action by supposing the formation of an image composed of double chloride of silver and gold, which is again reduced to the metallic state by the alkaline developer. This is the explanation we gave in speaking of the copper intensifier, and that it is the correct one there can be little doubt, as the marked difference in the colour and density of an image intensified in this manner, as compared with one chlorised without the interposition of a second metal, proves that some other effect is produced than the mere reduction of the silver. Further corroborative evidence is found in the fact that the solution of cupric chloride, after being used a few times, deposits a sediment composed in all probability of insoluble subchloride of copper, showing that a portion of the metal has entered into combination with the silver forming the image. We need not here recapitulate the advantages of this method, as we have already done so on more than one occasion, nor can we, until we have an opportunity of testing Mr. Lea's plan, institute comparisons between the two; but we think that, *cæteris paribus*, on the score of cost the copper salt will be found to carry the palm.

PHOTOGRAPHIC NOTES.

I.—Influence of the Base on Bromide Emulsions.

The recent investigations published by Mr. Warnerke are very interesting. It is to be remarked, however, that collodions used for emulsions change their properties in very various degrees by standing, and that this fact must greatly qualify conclusions based on the characters of emulsions obtained by the use of collodions immediately after making; that is, if of any two collodions emulsified immediately after the collodions were prepared one shows distinctly better qualities than the other it by no means follows that the same superiority would be exhibited by that collodion at the end of one, two, or more weeks. On the contrary, it might easily happen that the collodion which at first gave inferior results might, after an interval, do best.

Without having tried so large a number of bases as Mr. Warnerke, I made, some years ago, careful trials with several. In addition to the cadmium salt I tried potassium, ammonium, zinc, calcium, and aluminium. I found that, if used a few days after mixing, the potassium collodion did better than the cadmium. It ripened faster, and gave more intensity. But the essential fact was that a potassium collodion did not, at any stage or age, give a result as generally good as did a mixture of cadmium and ammonium collodion kept for a month in a light, warm room. This last was, perhaps, not quite so vigorous, but its sensitiveness was very much greater. Zinc bromide I did not like at all, though I have heard of zinc salts giving exceptionally good results when used in wet collodion for copying pictures. I did not like their action in emulsion at all. I notice, however, that Mr. Warnerke obtained good results with zinc; doubtless the conditions were different.

My experiments included also *aluminium*, which gave very bad results, and *calcium* salts, which acted most injuriously on the collodion, producing the effect sometimes called "rotting"—the collodion became very liquid, and gave a bad and weak film on the glass. It has, therefore, surprised me a good deal to find calcium salts recommended recently by a writer as useful in dry-plate work.

The mixed cadmium and ammonium collodion has the very great advantage that after reaching a certain stage of ripeness it then seems to remain stationary for a long time, so that for nearly a year one can be certain that one's material is in good order; doubtless by keeping in a cellar after the first month the period of good condition might be doubled. It would be very unsatisfactory to work with a collodion which was continually changing its character, so that trial plates would need to be made to judge of the condition of the collodion before emulsifying enough for a batch of plates. Collodions for emulsifying which contain an iodide do not keep so long as those which contain bromides only.

II.—Washing Silver Prints.

M. Salomon has recently suggested an extremely ingenious arrangement for washing prints, consisting of a box with a number of vertical partitions, with large holes bored through them. Between these partitions the prints are placed. A general idea of the plan may be got by imagining a plate-box in which the negatives are replaced by thin wooden partitions, between each two of which a print is placed. The great advantage is evidently that the prints are absolutely prevented from sticking to each other, or even touching each other, and thus a most serious difficulty is eliminated.

To make an absolutely perfect washing apparatus it needs only to modify this in two respects. First, to adapt a syphon to it so that it may fill and empty. Without this adaptation no system of washing is complete, and it is safe to say that an equally perfect washing may be effected in half the time and with half the water when this plan is used. And, secondly, the water, instead of being introduced as in M. Salomon's arrangement in a single stream through a faucet, should come through a rose, or, rather, a tube pierced with small holes and arranged *across* the direction of the prints, so as to make sure that water will be thrown against and between each and every

print. In the case of a box with transverse vertical partitions water delivered in a single stream scarcely acts upon remote parts of the box, but confines its action almost entirely to the portions upon which it falls. M. CAREY LEA.

A NOVEL SYSTEM OF PRODUCING LARGE PANORAMIC NEGATIVES BY MEANS OF ORDINARY SMALL CAMERAS AND LENSES.

[A communication to the Photographic Society of Great Britain.]

WHILE taking negatives on my sensitive tissue in the roller dark slide it occurred to me to utilise the peculiar advantages possessed by this method, and I now submit to your notice the result of my experiments.

To make my description intelligible I will briefly observe that the roller dark slide is the substitute for the ordinary dark slide, having, instead of the usual receptacle for the glass plate, two rollers on which an endless band of sensitive tissue is wound, and an arrangement provided to expose in succession one length after the other in the ordinary camera. The tissue itself is a flexible, transparent film, temporarily cemented to the paper, but detached from it after the negative is developed.

To produce a panoramic negative I expose the sections intended to form the panorama separately, by simply rotating the camera round its axis. Care must be taken to have the camera level and to provide the arrangement to produce the rotation of the camera round the vertical line passing through the centre of the lens. The lens must be of a non-distorting kind, otherwise the line forming the junction between two sections of the panorama will be concave on one and convex on the other, and, consequently, the junction impossible. The horizontal lines, through the same cause, would have the cycloidal shape on the panorama.

The exposure of every section must be strictly identical, and every such section must have a small part—a quarter of an inch—in common with the neighbouring portion.

For development the portions of the tissue containing all the panorama is developed simultaneously; by these means the intensity of all the sections will be identical.

When the film is detatched from the paper the separate sections are cut and placed on a glass plate which has been moistened with water, each part in respective relation to the other, which can easily be done, the tissue being quite transparent. At this stage the separate negatives will overlap each other a little. A sharp knife is now passed over the line intended for junction, and the overlapping bands of the tissue removed.

With only an ordinary amount of care the junction thus made will be almost imperceptible, but a further operation will make it less so. For this purpose solution of india-rubber in benzoin, followed, when dry, by plain collodion with castor oil, is applied to the joined negative. This will perfectly unite all the separate sections, so that when the glass is immersed in the water the film bearing all the panorama can be detached, it being now, in fact, one negative.

I had occasion to form, besides others, one panorama in five sections, presenting a gigantic negative thirty-two inches long, and this was made by means of a seven-inch camera.

I need scarcely observe here that retouching, which is easier on the tissue than on glass, will hide many imperfections of junction, &c.

I think I do not over-estimate the value of the power offered by this new system to landscape photographers, when the large size of the picture on one side and the portability of the apparatus on the other are considered.

By its adoption many inconveniences of the direct large, as well as enlarged, negatives are avoided; while some advantages are gained not yet possessed by photographers, viz., the possibility to include any angle of view up to 360° without sacrificing either rapidity or definition. L. WARNERKE.

GELATINO-BROMIDE.

BY some postal blunder the Journal for the 31st of March has only reached me today, though I received that of the 14th of April last week. I have, therefore, only just had the opportunity of seeing the details of "F. S. K's." modified gelatino-bromide process, to which allusions are made in the Journals for the 7th and 14th of April.

The suggestion as to the use of catechu is eminently practical, and I shall take care to try it as soon as the state of the temperature—at present over 100° in the shade—will permit; but I cannot see that the formula or manipulation offers any other recommendation. The preparation of the emulsion is a tedious business, extending over as much as eighty-four hours, if the best results be desired, and requiring attention at frequent intervals during the latter half of the time. The sensitiveness—to judge from the author's description—is certainly not greater than that of one of the *old* Liverpool plates, and the development is encumbered with the addition of bromide of silver, the preparation of which is an additional inconvenience.

If the advantage gained by these complicated and prolonged operations be density at the expense of rapidity, I think that the addition of a little free bromide to the simple emulsion would be found to have much the same effect. I find, on referring to my note-book, that I tried this plan, and found density was much more readily obtained on negatives prepared with emulsion containing free bromide than on those prepared with the same emulsion before the addition was made, but that the films were certainly slower. I was experimenting with an ounce of emulsion, and the record of my proceedings runs as follows:—

"*Feb.* 11, 1876.—Added the gelatine to the solution of bromide of potassium at 8.45 a.m.; sensitised at 12 noon; placed in dialyser at 7.40 p.m.; filtered at 10.30 p.m.; coated six plates; then added fifteen minims of thirty-grain solution of potassium bromide and coated six more. The plates were dried in a box containing quicklime, and were put into the plate-box at about 3 a.m."

This was, I think, tolerably quick work, and the simplicity of the manipulations could not be well exceeded. The whole batch turned out fairly, though, owing to the presence, as I believe, of chloride of silver due to the chlorides in the water with which the emulsion was made, there was a want of brilliancy about them. The simple emulsion plates, or "A" division, were rather over-exposed with two minutes' exposure to a fairly-lighted landscape. The lens used was single—the back lens of a Dallmeyer's rapid rectilinear—having twelve inches focus. The stop was No. 4; its size with reference to focal length of the lens I cannot accurately give, as I have left my apparatus behind me, but I think it is $\frac{f}{18}$. The "B" section, or bromised emulsion plates, were under-exposed with the same exposure, but gave decidedly denser pictures.

I am disposed to think that it is to improvements in development we must look for density; I am sure that small and apparently unimportant variations in development tell very distinct tales in the negative. A very strong pyro. developer, with weak carbonate of ammonia and plenty of bromide (if it have not been added to the finished emulsion), gives, I believe, the best chance; but when I begin experiments again I shall carefully record every detail regarding each experimental plate, and hope to be able to come to some sound conclusion on the subject.

I am very glad to see that gelatine emulsions are attracting renewed attention now, and that a large number of careful experimentalists are at work upon them. My own efforts will be directed towards the attainment of perfect negatives in the simplest manner, and with the fewest materials possible, so that I do not expect to make any brilliant discoveries; but if I succeed in making perfect photographs possible wherever glue, lunar caustic, and bromide of potassium can be got I shall be contented.

I may add that my plates, though they do not profess to be very rapid, are respectably so when compared with others. I got a very curious picture of the interior of a well in three minutes, when a friend of mine who is very successful with Mr. M. Carey Lea's chloro-bromide process, which in his hands is nearly as quick as wet collodion, failed to get a view of an image in four. We were at least twenty feet below the surface of the ground, so that all the light we had was vertical, and was certainly not much more favourable than the light of an ordinary winter's day or of the interior of an average church with the sun obscured. I will send you a print of this negative, which will explain itself. The well is said to have been built by Mohammed Begurra as a place of retreat from the glare of the sun on the occasion of his suffering from some disease of the eyes, so you may suppose that it is a shady spot.

Over-exposure has no doubt a great deal to do with want of density in gelatine negatives. I have some beautifully full of detail which are ruined by that fault, and I observe that "Franklin," in the Journal for the 7th April, notices it. His idea of having free nitrate in the emulsion and getting density in that way is a good one. I tried it two years ago, and was astonished with the vigour of the image when ammonium bromide was used. Here is my note on the subject:—

"*Jan.* 10, 1874.—Having about two drachms of the ammonium emulsion by me, I added about one-third of a grain of nitrate of silver to it and coated some plates. The result has surprised me; the plates were much more sensitive to weak radiations and much clearer than before, while they are just as free from fog. They are twice as rapid as the neutral plates at the very least * * I shall today prepare some potassium emulsion and add silver."

"*Jan.* 11.—Prepared potassium emulsion as usual (two and a-half ounces), added four grains silver nitrate. Result fair, but not superior to old ones. There is more tendency to fog, and the images are hardly so dense as I could wish."

This was the last experiment I tried in England, and it was not satisfactory. The ammonium emulsion had originally been prepared to test its qualities in comparison with potassium emulsion, and was found slow and feeble. The potassium plates were badly stained in patches; but this I attributed to contamination with hypo., as my apparatus had been tampered with by a careless person, and the stains were evidently independent of the emulsion. I remember that the emulsion darkened immediately on being exposed to light. The ammonium negatives were extremely dense and vigorous, and after fixation and drying the plate looked like an engraved block, the relief of the image was so great.

It is curious that my successful experiment should have been made with ammonium, the salt recommended by "Franklin," and that my experience of potassium with excess of silver confirms his. The fact that two independent workers should have hit on the same combination with good results may, perhaps, induce Mr. Berkeley or Mr. Palmer to verify it. I should repeat the experiments at once if I could, but for the next six months at least gelatine photography is not to be thought of here. I hope Mr. Berkeley will not find fault with me for coming out with my note-book now upon the challenge of "Franklin" and himself; for I claim no credit for what was a mere empirical addition to the emulsion, prompted by my experiences with the old chloro-bromide process, and I only print my notes because they record my proceedings accurately and concisely, and may, therefore, be of interest to fellow-workers.

I read Mr. Berkeley's papers on the subject of gelatine-bromide with great interest, believing him to be a fellow-enthusiast, and I sincerely hope that he may have the credit of solving all difficulties connected with the process, and setting it on a level with collodion in every respect. My experiments were not conclusive, so I did not publish the results, which I should certainly have done in the interests of this process if they had been of any real value.

On the subject of the actinism of the rays from a paraffine lamp, on which Mr. Berkeley makes some remarks in the number for the 31st of March, I may mention that I find the light of a kerosine lamp, of the kind called a "hurricane lantern," most distinctly actinic, as I found the ends of my plates, which projected beyond the shelves on which they were drying, always fogged if they were exposed to the very sober light of such a lantern placed six feet and more away and falling very obliquely on them. There could be no doubt of the cause, as the line on the developed plate was perfectly straight, and could not be accounted for in any other way. This irritability under feebly actinic light is quite a nuisance, and I am doubtful whether the advantage of a little extra rapidity is not dearly purchased by it.

I should like to know if anyone has tried Mr. Warnerke's method of dialysing collodion emulsions. I own to having a partiality for the dialytic method of getting rid of superfluous salts, and I should be glad to know in what the washing plan is superior. It seems to me that unless one is preparing pellicle on a large scale—which would, I suppose, be an infringement of Mr. Kennett's patent—this dialyser is a great economiser of time and trouble; and, for the matter of that, pellicle can be prepared by desiccating the dialysed emulsion in the dialyser, as one of the Editors suggested to me in conversation before the patent was obtained. What is gained by allowing the emulsion to set and washing it, at the risk of losing a good portion, when the object aimed at is two or three ounces of emulsion for experimental purposes, I cannot understand; and if, as seems probable, some method be devised for securing the perfect emulsion from decomposition, the advantages of desiccation will be reduced to a minimum. If it were the truth that the trace of potassic or other nitrate surviving the operation affected the experiment I could understand the necessity for preserving a method which gets rid of soluble salts altogether, but this is not advanced against dialysis. The sole advantage of washing the emulsion seems to be to clear it of crystalline substances; and if this can be done sufficiently for practical purposes in three hours by the help of a dialyser and a gallon of water standing quietly in a corner, I do not see what advantage is secured by the tedious washings and changes of water recommended by those who advocate what they probably call the "simpler" method.

I am unable, for reasons already explained, to experiment with gelatine emulsions at present; but will you allow me to suggest to Mr. Palmer, Mr. Berkeley, "F. S. K.," or any other worker in the field, that an emulsion should be prepared and half of it dialysed for about three and a-half hours, the rest being allowed to set (without ice) and washed for six hours, or some such time as may be deemed necessary? The merits of the two methods could be determined by the quality of the *negatives* obtained from the perfected emulsions. The same quality of water should, of course, be used for both operations, and any additions made to one batch of emulsion, to vary experiments, should be made to the other. I confidently believe that it will be found that the dialytic plan takes less time and trouble by one-half than the other, and that the results are identical. Care should be taken that the dialyser be not put in so warm a place that the water in which it stands is kept at a very high temperature, as, if the emulsion be kept very hot for a long time, it is apt to give trouble in development. I have never had a wrinkled plate out here, where there is no fire to put the dialyser by; and if the water be hot to begin with there is no fear of the gelatine setting while diffusion is going on. I use a copper hand-basin, tinned inside, to hold the water, and my dialyser is supported on three egg-cups. There is no mess or trouble, and there is an exactness about the thing which I think can never be attained so well by the washing plan. Of course I am open to the charge of prejudice, but I am quite willing to be convinced. J. King, *Bombay C.S.*

P.S.—May I ask whether there are any professional men in London who undertake to print amateurs' negatives with such preparation as the stopping-out of unduly-thin skies and the obviating of accidental defects in the film may require, and, if so, whether you can direct me to one, if this be not a breach of editorial reserve.* I have not much time to spare, and printing is not a cheerful amusement in a warm climate. Some of my negatives are valuable to me as records of places visited by me on duty; but, as I have been working hitherto more in the way of experimenting than of picture-making, they are sometimes not so technically perfect as to make prints from them pleasing as pictures. Though I hope to work next season by the light of experience, which will obviate all causes of failure, I do not like to condemn the whole of the last year's work as useless because the negatives would be improved with a little legitimate manipulation (which I believe such work as I have indicated is allowed to be), and I have not the manual dexterity to undertake it myself. I have tried printing on durable sensitised paper, and one or two proofs were pretty successful; but the last time I tried it I could get nothing but *mealy* prints with the toning and fixing bath, which I generally use for taking proofs with, and which I have hitherto found to answer well for such a purpose. I find, on looking over my album, that I have a proof of one of the "A" batch of plates mentioned in my letter. The subject is of no interest, and it would not be worth sending only that it will show you the character of negatives which I obtain by my process. The paper on which it was printed was very dark when put into the frame. I may say, by the way, that paper renders very inefficiently the exquisite detail of gelatine plates, and that they ought properly to be printed as transparencies.—J. K.

Addendum.

Since I made up my packet for you I have received the Journal for the 21st of April. I am much pleased to find that there is so much in common between "Franklin" and myself, and wish him every success in his valuable course of experiments in development. I wish I were nearer home, for the record of my experiences will come unprofitably to your readers when it arrives after the discussion is over and the question closed; but I expect you to use the editorial scissors sharply, and not oppress the public with a twice-told tale.

I am glad to notice that "F. S. K." has raised the question of dialysis *versus* washing. I hope I was not discourteous in my remarks on his modification of the gelatine process, for he is evidently doing much to clear away our difficulties. I only spoke as the advocate of simplicity, because I think that we do not yet quite understand what the simplest combinations are capable of.

"Franklin" asks what was the formula with which I prepared my most rapid plates. I find it was the following:—

Gelatine	40 grains.
Bromide of ammonium	18 „
Nitrate of silver	30 „
Water	1 ounce 5 drachms.
Alcohol	3 „

After dialysing this emulsion, which had bromide slightly in excess, I added to a portion what was equivalent to two and a-half grains of nitrate of silver to the ounce. This gave me the most rapid emulsion I have tried, combined with great vigour of image. I have not repeated the experiment, as I have been trying to develope the

* In reply to Mr. King's query, we beg to say that all the printers in London or its vicinity undertake the kind of work to which he refers; the business announcements and addresses of such are always to be found in the advertising columns of this Journal or in our Almanac. The print that was enclosed possesses exquisite detail. We need scarcely add that if our correspondent experience the slightest difficulty in the selection of a printer we shall willingly put his negatives "in hand" for him.—Eds.

capabilities of the potassium salt and neutral emulsions, and have not been aiming at rapidity.

My ordinary plates are fairly sensitive, and in preparing them I have lately adopted a formula published in your columns by "Amateur," last year, which is richer in silver bromide than my original formula. I am by no means sure that it is necessary to use so much silver bromide, but I think the emulsion is mechanically better. I always stir the gelatine into the silver solution, and never have the slightest difficulty in getting an emulsion which in seven or eight hours, including the time of dialysing, is smooth and creamy, showing a rich, ruby glow by transmitted light. "Frilling" I have never had out here. When I was preparing some plates to illustrate a paper read before the Photographic Society of Great Britain I was greatly annoyed by this trouble, which, as I was short of time, reduced me to the necessity of showing what to avoid rather than what to aim at. On consideration I felt sure that the mischief was caused by the lamp I used to keep the dialysing apparatus warm. The gelatine had been kept at a high temperature for some hours, and its properties had become impaired. This is in accordance with "Franklin's" views, and is another example of their coincidence with mine.

As regards the rosy glow with which I am sometimes troubled, I have observed it on plates developed with carbonate of ammonia, as well as on those in the development of which liquor ammonia was used. It is not a stain, for it varies in intensity with the thickness of the film; and of two plates of the same batch developed under the same circumstances, so far as I can see, one will show it and the other not. On referring to my note-book I find that the formula I used in February last was as follows—

Gelatine	40 grains.
Bromide of potassium	40 ,,
Silver nitrate	55 ,,
Water	2 ounces.
Alcohol	4 drachms.

The quantity of silver is about two grains short of the theoretic equivalent, but it is only one grain short of the amount required to forty grains of potassium bromide according to Mr. Warnerke. The emulsion after dialysis may be considered neutral. I do not notice any milkiness in the water outside the dialyser, so I believe all the nitrate is converted. I think these proportions are not quite the same as "Amateur's," but they are not far off.—J. King, *B.C.S.*

MECHANICAL PRINTING.

The following practical directions for mechanical printing are from the text of Herr Husnik, and which have appeared in several continental journals:—

Use for the support some plates of glass of six millimetres or less in thickness, roughened on one side by means of very fine emery and water, and applied by friction from another and smaller piece of glass to which a handle is attached. Do not allow the emery to become dry, or it will produce deep scratches. A circular motion should be adopted, using considerable pressure, and in about twelve minutes a very fine grain will be obtained. If plates be employed that have been previously used remove the gelatine by immersing in a vessel containing a solution of soda. This wash keeps more than two months, and it is always possible to strengthen it by the addition of lime. The gelatine in the case of a plate that has been previously used will detail itself in about twelve hours. Rinse the surface and rub with emery to remove the gelatine that may have lodged in the pores; but this time one application of the emery will suffice. The glasses thus prepared are washed in several changes of water and wiped dry with clean cloths.

First: *Preparation of the Plates.*—Take—

Fresh albumen	25 parts.
Distilled water	45 ,,
Silicate of soda	8 ,,

Mix well together, beat to a froth, and allow to stand for several hours; then decant the clear part and filter it two or three times so as to ensure its being free from all impurities.

In preparing the plates place them, ground side uppermost, on a large slab of glass carefully levelled, and, having brushed them over with a soft brush to remove all dust, pour a little of the preceding liquid near one edge, and cause it to flow over the surface by slightly inclining the large slab. If the liquid do not flow over the glass easily it can be helped on by using a small slip of paper, taking care that it does not run too fast. Now raise one of the corners so as to allow the superfluous liquid to flow off the plates into a receptacle placed beneath, and if there be any air-bubbles on the glass pour some of the solution over it again while the glass is in an inclined position, leaving it thus to dry. The superfluous liquid can be filtered and used again. A great number of plates may be prepared in this way and kept for about six months; but it is better not to use them on the day on which they are prepared, as they improve by keeping.

In order to coat the plates with gelatine they ought first to be carefully washed with cold water, taking care not to injure the prepared side. Let them stand upright until dry, after which they are ready to receive the gelatine, which is done in the following manner:—

Provide a case with a bottom of sheet iron and a curtain for the top, and in the interior, about seven centimetres from the bottom, place a frame, upon which stretch calico or filtering-paper so as to diffuse and equalise the heat, which is obtained from a spirit lamp. About seven centimetres or so from the top bars of iron with levelling screws are placed horizontally. A thermometer, with the bulb inside and tube and scale outside, fastened at the side, indicates the temperature of the interior. Place two, three, or more of the plates on the levelling screws, laying them in a horizontal position; shut the case and heat to 110° Fah.

During this time put seven and a-half grammes of the finest French gelatine in 150 grammes of distilled water, and leave it to soak for about an hour, after which dissolve in the water bath. Next, heat to a high temperature, and add one gramme of bichromate of ammonia and half-a-gramme of chloride of calcium; when these are all dissolved add thirty grammes of ordinary alcohol, after which filter. This solution is poured upon the heated plates, and must be spread by means of a small slip of paper. Experience regulates the proper quantity to be applied, and a considerable degree of dexterity will be required; but this is easily attained. Care must be taken to prevent the layer from being either too thick or too thin. The plates thus coated are placed in the case to dry at the temperature of 110° Fah., and after being well dried they will keep in summer for about eight days, and in winter about four weeks, in a dark place; they improve by keeping.

Exposure.—With a good negative in the shade an exposure of from fifteen to forty-five minutes will be required, according to the intensity of the light—diffused light giving the best half-tints. After exposing, the bichromate not acted upon by the light is removed by being washed with water, and the plate is then well drained and dried. In about three hours they are ready for being printed from.

Printing.—The plate is attached, by means of plaster of Paris, to a lithographic stone, and submitted to the action of a lithographic press. Damp the plate and ink it with two kinds of ink—one stronger than the other. After obtaining a print the plate is moistened, wiped with a cloth, and inked. If the details in the shadows be not properly brought out, put extra pressure on that part. One plate will furnish a considerable number of proofs, provided the instructions be carefully carried out and the gelatine be of good quality.

Final Observation.—This method, according to my experience, is the best one in use, and it gives certain results. Some photographers substitute isinglass for a portion of the gelatine, but this substance can rarely be obtained of good quality.

The choice of the inks is very important. Munich varnish ought not to be used for black, as it attacks the gelatine and the plate loses its vigour. Good black printing-ink answers better when mixed with red oxide of iron, and a little César varnish imparts a good brown tint.

NOTES FROM THE NORTH.

Fashion seems more or less to rule almost everything. I recently had a leisure day in Glasgow, and spent it in visiting nearly every photographic studio in what our neighbours somewhat proudly call the "Western Metropolis." No doubt Glasgow is a fine city—at least from a business point of view; but its greatness in this respect entails certain disadvantages and discomforts which are rather trying to strangers. Ground and premises within anything like easy reach from it are so much in demand for business purposes that photographers are, with few exceptions, relegated to the very tops of the houses, and he whose mission it may be to visit the studios had need to be sound in both wind and limb, as he will have on an average to make an ascent of between eighty and ninety steps before reaching his goal.

The first thing that must strike the visitor to the Glasgow studios is the fact that in nearly all cases they have been constructed on the same principle and in similar situations. The *modus operandi* seems to have been to get possession of the roof of a house, and in some

instances of two, remove both timber and slates, and erect in their place such a combination of wood and glass as would include laboratory, printing-room, and studio, or rather studios, as few have less than two, and some even three. The studios, as I have said, are nearly all built on one plan. The backgrounds are placed against the gable of the neighbouring house, and, as they are generally the whole breadth of the house, two, or even three, sitters or large groups may be taken at one time. The source of illumination is almost invariably a large sloping front light supplied with broad louvre boards arranged in sections, easily worked by cords hanging quite near the camera. There are also in many cases side lights, but so far as I could see, they are not much used.

Glasgow is a large city, and everything in it, including photography, is done on a large scale. This accounts for the very general desire or necessity for being able to take more than one sitter at a time. "The fact is," as one of the most popular photographers explained to me, "we do a very large trade, but it is mostly during meal hours and half-holidays, when the workpeople rush in in large numbers, anxious to be taken and be off again in the shortest possible time. There is not much time for ceremony, and none at all for dressing or arranging. We get their money, chuck them into the head-rests, and fire away, never doubting that each shot will be a success. Generally speaking a full exposure is given, and the plates are developed with iron and laid in trays filled with water, where they remain till the time for sittings is passed. They are then fixed, and, after getting a swill in a solution of iodide of mercury in iodide of potassium, are well washed and placed in racks to dry. Next morning they are varnished, and after a little—just a very little—work with the pencil are ready for the printer." Of course by such a method of procedure very high-class work could not be expected; but I am bound to say that an examination of the prints in the hands of the finishers showed that it was decidedly above the average of what is usually supplied by those who take more time to it—an opinion largely shared in by the Glasgow public, if I may judge from the fact that I saw nearly a hundred frames in actual use, and was told that such was just about their average number.

The above description does not, of course, apply to a few of the studios in the more aristocratic localities. There individual taste has been more exercised, and greater attempts at elegant display are manifested; but, on the whole, as compared with some other large cities I have visited, the saloons and reception-rooms of Glasgow have more the air of being got up for business than display.

In several of the reception-rooms I noticed an innovation which has not, so far as I know, reached Edinburgh. It is the hanging on the walls of a number of paintings—not painted photographs, but genuine oil-paintings, with, in most cases, prices attached. This has the double advantage of being an attraction to visitors and also a source of income when sales are effected.

On calling on Mr. J. Stuart, the President of the Glasgow Photographic Association, I found him almost at his wits' end in consequence of inability to get a pigment tissue suitable for transparencies for enlarging purposes. He is a carbon printer of long standing and a licensee of M. Lambert, and makes most excellent work. He showed me some transparencies which, on cursory examination, seemed perfect, but which, when seen slightly magnified, were found covered with small black spots, the effect on the enlarged negatives being to completely riddle them with large pinholes. The preparation of a suitable transparency tissue should not be a difficult matter. I have no doubt that those who at present have a monopoly of its manufacture are anxious to make it as perfect as they can; but a little wholesome competition would, I think, be good for all parties.

While speaking of studios it may be of use to some of the readers of the Journal to acquaint them of a method of lighting the so-called "Rembrandt" pictures which I recently saw in use by Mr. Robertson, of Dundee, whose name I mentioned more than a year ago in connection with "penny photographs." His new studio in the Perth-road is a large erection on the ridge-roof principle, with one opaque side. In this, and pretty close to the background, he has placed an ordinary bow window, fitted with blinds like a common dining-room, and with the sitter placed close to it he makes some of the finest of the so-called "Rembrandt" effects that I have ever seen. He told me that the idea suggested itself to him during a visit to a friend, in whose sitting-room there was a similar window. He said—"I always carry photography with me wherever I go, and on the occasion referred to there was a lady sitting near the window, on whose head the light produced a most charming effect: I thought if I could only produce anything like that in my pictures I should attain to the height of my ambition, but said nothing. Next day I set the masons and carpenters to work, and within a week the bow window was in full operation, and I have no cause to regret the outlay thereby incurred." I may say that, in using the window, the sitter is placed nearer or farther from it according to the intensity of the effects desired; that the whole of the top light on that side is screened off, and just sufficient admitted from the roof on the opposite side to give a greyish tint to the shady side of the face. This method may not be so good as the more general arrangement of screens and reflectors, but it is one by which, with very little trouble, very fine results are obtained. J. Nicol, Ph.D.

GELATINO-BROMIDE PROCESS.

[A communication to the Photographic Society of Philadelphia.]

Having recently made a somewhat extended series of experiments as to the capabilities of the gelatino-bromide process, and having found it a really valuable one, I desire to call the attention of the members present to a few negatives for critical examination, and also to lay before them the method of working I have found to be most certain, and which gave the best results in my hands. I cannot say that I have thoroughly tested this process, as I have yet to try it in the heat of the summer months, which trial I think will be the most severe; but up to the present time my experience has been most satisfactory.

In order to ensure the successful working I have found the following most important, and the neglect of which will, I think, invariably result in failure:—A chemically clean plate, rapid drying, and proper thickness of film. As to the material, I find Nelson's ordinary gelatine, that used for jellies, &c., answers all purposes, and my experience has been that, should failure occur, the cause need not be looked for in that direction.

My method of preparing the plate is as follows:—Clean first with acid, then with tripoli and water, with a little alcohol; this seems to give a fine grain to the glass surface, which, I think, assists the adherence of gelatine. After rubbing off the tripoli, dry, polish with a few drops of alcohol and ammonia (equal parts), applied with a piece of clean flannel. I will describe the making of two ounces of finished emulsion:—

Place in a four-ounce bottle thirty-six grains of gelatine, and add about two ounces of water; after two or three hours pour off the water as closely as possible; place the bottle in a dish of warm water, and add half-an-ounce of distilled water and thirty-six grains of bromide of potassium. While the gelatine and bromide salts are coming into solution dissolve fifty grains of nitrate of silver in six drachms of water (distilled), and place it in the dish to become slightly heated; then, in non-actinic light, add the silver in four portions to the bromised gelatine, shaking well after each addition. I then place the bottle in a small pasteboard box, light-tight, near a flue or in a warm place, and leave it for eight or ten hours, or over night. Add to it then sufficient distilled water to make up two ounces; heat it, if necessary, in a hot water bath, to render it perfectly fluid, and dialyse it for four or five hours; the dialyser is, as you see, simply a tumbler with the bottom cut off. The parchment paper is first wet, and then stretched over and secured by a gum band; the three supports are attached by another band. This is placed in a shallow dish, and warm water poured in until it touches the whole surface of the parchment floor, the dish being supported over a Bunsen burner, turned down quite low, as it is only necessary to keep the water just tepid; the gelatine is then poured in and left to dialyise. At the expiration of the time above mentioned it is filtered through four thicknesses of papier-Joseph, and is then in condition to coat the plates, or may be set aside in a cool place to be used within a few days.

To coat the plate requires a little dexterity. I have succeeded best in the following way:—Warm the plate over an Argand burner (a non-actinic one); take it with your pneumatic holder, and pour on a pool of gelatine as you would collodion; bring it down (after covering the off corners of the plate) slowly, guiding the edge with the lip of the beaker from which the gelatine is poured by humouring it a little, and you may take your time; the plate will be easily covered. Drain it as you would a collodion plate, but not so closely, and place it on a perfectly horizontal shelf to set, which it will do in about ten minutes. The quantity above taken will coat from eight to ten 4-4 plates.

To dry the plates I use a cupboard, under the bottom of which is a sheet-iron drum, with opening for the supply of fresh air; this is heated by a Bunsen burner, and keeps up a constant supply of warm air to the cupboard above, in which there are two shelves of plate glass, accurately levelled, with openings at the ends to permit the circulation of hot air, which, after passing over the plates, is taken off at the top. The plates become thoroughly dry in from three to four hours.

I have here a coated plate, which will serve as a guide for thickness of film, &c. I prefer dialysing to washing out the free salts; it is less troublesome.

As to the rapidity of these plates: they are not the most sensitive, but are fairly so. An exposure of one minute, with an $\frac{f}{25}$ stop, will be found sufficient. By increasing the proportion of silver in the emulsion they can be made as rapid as wet plates, but I prefer the formula as given. These plates will "blur," and require backing. I have reduced this defect very much by staining the film with rose-aniline, without detriment to the result.

Development.—Allow the plate to soak for at least three minutes in water; then use the alkaline developer, but flowing the plate first with the pyro. and bromide, and adding the ammonia afterwards. I use the pyro. dry, and not in alcoholic solution, which latter I think is apt to cause wrinkling of the film. The image should come up *slowly;* a rapid development or a forced one is apt to produce a foggy result.

The developer I use is—

Pyro	3 grains.
Water	1 ounce.
120-grain solution of bromide of potassium	1 drop.
Saturated solution of carbonate of ammonia	1 or 2 drops.

This will bring up the image to sufficient density in most cases; but when the image is flat and thin I prefer to intensify with chloride of copper and alkaline pyro. The negatives, with two exceptions, were intensified in this manner. The negatives, when fixed in hypo. and well washed, are allowed to dry spontaneously, and with careful handling can be used for printing without being varnished.

G. W. Hewitt.

SOME FURTHER REMARKS UPON DOUBLE SALTS OF CADMIUM AND THE IODISING OF COLLODION.

It is not my intention to discuss here either the quantity of iodising salt or the best proportion of bromine and iodine to be used for various purposes, but merely to furnish a contribution towards the solution of the question, not yet sufficiently answered, as to the most suitable combination of the various iodine and bromine salts, and to speak of some practical conclusions deducible from my previous labours. It is well known that it is not immaterial what sort of iodising salt is used, but every one has not yet agreed to start from exact figures; yet it is only upon this basis that the subject can be profitably discussed. In so far as it has seemed to me to be in my power I have furnished these exact figures with the most scrupulous care.

First of all, the employment of *potassic salts* in collodion, especially in bromised collodion, should be subjected to a more minute discussion. Hardwich* first showed how difficult of solution potassic bromide is in collodion, and he, therefore, advises the use of potassic iodide in bromo-iodised collodion, which, with other bromine salts, on account of its difficulty of solution is for the most part thrown off in the form of potassic bromide. In my tables of the points of solubility it is submitted that, with the exception of the cadmium salts, collodion (with equal parts of ether and alcohol) is only in a position to dissolve some 0·06 per cent. of potassic bromide—a quantity which, for photographic purposes, need not even be taken into consideration if one wish to satisfy the need of bromine in the bromo-iodised collodion with potassic bromide only. The solubility is not increased by the addition of potassic iodide or ammoniac iodide to the collodion; but it is considerably increased by cadmic iodide or cadmic bromide, by which, however, no double salt is formed, but, on the contrary, on attempting to dissolve the potassic-cadmic bromide in collodion, it is decomposed into potassic bromide (which is thrown off) and soluble cadmic bromide. Some of the points of solubility show that alcohol-ether (one volume : one volume) which contains five per cent. of cadmic iodide dissolves almost 0·2 per cent. of potassic bromide. A five-per-cent. solution of cadmic bromide in alcohol-ether is almost as solvent. Furthermore: potassic iodide alone cannot iodise collodion as strongly as is often necessary, since collodion—ether and alcohol (1:1)—only dissolves 0·9 per cent. of it. The solubility of potassic iodide is excessively increased (about fifteen times) by the presence of cadmic iodide; indeed, in this case the action of the cadmium is not only physical (if I may so express myself), but it gives rise to a very soluble double salt, from which the collodion is capable of dissolving about twenty per cent. Potassic cadmic iodide, in consequence of its ready solubility, is suited for the preparation of collodion containing *only iodine;* but should bromine salts be added it is no longer to be recommended, because then potassic bromide is formed, whose difficulty of solution may be injurious.

In spite of these unfavourable premises Captain V. Tóth† and I prepared a collodion which contained potassic-cadmic iodide and bromide. It had the following composition: fifty cubic centimetres of absolute alcohol, 2·24 grains of twofold potassic-cadmic iodide, and 0·37 grains of single potassic-cadmic bromide. Part of the potassic bromide was thrown off, and, after standing twenty-four hours, the liquid was filtered and mixed with raw collodion in the proportion of one volume of the former to three of the latter. Another collodion was prepared from fifty cubic centimetres of alcohol, 2·24 grains of potassic-cadmic iodide, and 03·4 grains of single ammoniac-cadmic iodide, and it likewise threw off a quantity of potassic bromide. These collodions, like all those into the composition of which potassic salts enter in any considerable quantity, are less durable than those hereafter described as ammoniac-cadmic collodion, nor do they furnish such fine pictures—a circumstance that may be adequately explained by the easily-demonstrated increase of the deposit of potassic bromide through evaporation of the ether and alcohol, and the consequent enlargement of the bromide of silver film. *Small* quantities of potassic bromide in collodion are not injurious (indeed, potassic salts enter into the preparation of many collodions that work well), but in no case does the potassic bromide add to its value, and the omission of potassic salts is, without doubt, advisable.

As for the *sodic double salts* I have not considered them, since they are defective in an essential characteristic—the stability of the salts; and their preparation pure from the generally-impure sodic salts is attended with difficulty. Tóth and I experimented with a collodion equivalent to one of those mentioned above, using sodic-cadmic bromide and iodide; it worked very well, was very fluid, and was almost as sensitive as the ammoniac-cadmic collodion about to be described, but it presented no superiority over the latter, and was, moreover, less durable.

Superexcellent properties are exhibited by the *ammoniac double salts,* which not only possess a great susceptibility for being crystallised, and are, therefore, easily prepared, but are also exceptionally stable. The single ammoniac-cadmic bromide is quite durable, does not effloresce like cadmic bromide, and is not hygroscopic like sodic bromine. Similar is the twofold ammoniac-cadmic iodide, which is also very stable; indeed, when it is set in action the ammoniac iodide is displaced and soon becomes red, so that an ammoniac iodide collodion iodised loses a great deal of its sensitiveness.

The question is now—Which is the better salt, the single or the twofold ammoniac-cadmic iodide?* Comparative experiments, having in view the settlement of this question, with collodions, of which one was prepared with single ammoniac-cadmic iodide and single ammoniac-cadmic bromide and the other with equivalent quantities of twofold ammoniac-cadmic iodide and the same double bromine salt, showed that the first gives a not very durable collodion, which is quite colourless when first prepared, but begins to yellow after standing some time; the second, on the contrary, gives a collodion distinctly recognisable as more sensitive, which shows slight yellowing several hours after being iodised, but this discolouration does not increase in any degree worth mentioning, even after standing a very long time. The collodion iodised with the first-mentioned salt is not so fluid as the raw collodion; that iodised with the last-named salt does not change its consistency. On these grounds, founded upon a great number of parallel experiments, we have come to the conclusion that the twofold ammoniac-cadmic iodide is the better, and to recommend it as the most suitable of all iodising salts.

By using three separate kinds of iodising salts one can easily obtain iodising fluids, in which any desired proportion of bromine and iodine predominates, and yet only get double salts. This is shown by the following equation:—

$$19\,CdI_2 + 12\,NH_4Br + 22\,NH_4I = 4(NH_4Br\,CdBr_2) + 15(2NH_4I\,CdI_2),$$

according to which by the solution of one atom of bromine to five atoms of iodine—that is to say, by the simultaneous solution of 69·5 grains of cadmic iodide, 31·9 grains of ammoniac iodide, and 11·8 grains ammoniac bromide—one gets the same solution as from 103·8 grains crystalline twofold ammoniac-cadmic iodide and 15·2 grains of single ammoniac-cadmic bromide. Precisely the same iodising solution is obtained by a solution of ammoniac iodine, cadmic iodine, and cadmic bromide:—

$$34\,NH_4I + 6\,CdBr_2 + 13\,CdI_2 = 4(NH_4Br\,CdBr_2) + 15(2\,NH_4I\,CdI_2);$$

that is, from 49·3 parts of ammoniac iodide, 47·6 parts of cadmic iodide, and twelve parts of crystallised cadmic bromide one obtains the same solution as from 103·8 parts of twofold ammoniac-cadmic iodide and 15·2 parts of ammoniac-cadmic bromide.

The salts mixed according to the following formula contain iodine and bromine in the proportion of three atoms to one:—

$$22\,NH_4I + 6\,CdBr\,6\,CdBr_2 + 7\,CdI_2 = 4\,(NH_4Br\,CdBr_2) + 9\,(2\,NH_4I\,CdI_2).$$

By these examples I hope to have made clear how the *rationale* of the composition of the iodising salts in collodion is ascertained; it can easily be calculated if the various salts be mixed which lead to, and in the quantity in which they exist in, double salts, and which salts exist free. Most of them are prepared from cadmic iodide and bromide and ammoniac salts, and, as the above examples show, at present one can obtain useful iodisers from single ammoniac-cadmic bromide, twofold ammoniac-cadmic iodide, and free ammoniac iodide.

On the basis of these observations the objection might be raised that it is superfluous to prepare the double salts for iodising purposes, since

* Hardwich's *Manual of Photographic Chemistry,* page 124. Berlin, 1863.

† All the photographic experiments and testings of collodions were worked out by Captain V. Tóth and me together.

* The double salts A 2, B 2, C 2, E 1, F 1, on account of their instability (see details under these headings in former paper) are not taken into consideration.

by mixing the single salts the very same salts are produced at once in the collodion from the single salts. But here the important point is brought out that the single salts are not durable, while the double salts are quite durable; therefore, the use of the ammoniac-cadmic salts has at least as much justification as the use of ferric sulphate in place of ferrous sulphate in the developer. It is also no small advantage to have only to use two preparations in order to get the same result as at least three primary salts would be required for.

This is also the place to speak of a very interesting observation made by V. Tóth and myself—that collodion containing more ammoniac iodide than, according to the formation of the before-mentioned cadmic salts, can be introduced into twofold ammoniac-cadmic iodide; or, in other words, that collodion containing free ammoniac iodide, besides the ammoniac-cadmic double salts, is more liable to decomposition, but is, at the same time, more sensitive than that iodised with double salts only. The liability to decomposition increases in proportion to the quantity of free ammoniac iodide, as is amply shown by our half-yearly examinations. The sensitiveness, however, does not increase in proportion to the ammoniac-iodic contents, but soon reaches a limit which it cannot overstep.

We compared collodions of which—

A was iodised with a solution of one part of single ammoniac-cadmic bromide and 5·8 parts of twofold ammoniac-cadmic iodide.

B with one part of bromide double salt, four parts of twofold ammoniac-cadmic iodide, and 1·5 parts of ammoniac iodide.

C with one part of bromine double salt, 2·2 parts of iodine double salt, and three parts of ammoniac iodide.

D with one part of bromine double salt and 4·8 parts of ammoniac iodide.

The bromine and iodine contents of all four collodions were equivalent. After six months *D* was most strongly tinged, *B* and *C* less so, and *A* by far the least affected.

Ammoniac iodide can also be set free by the addition of ammoniac bromide to twofold ammoniac-cadmic iodide, by which single ammoniac-cadmic bromide is formed. The process is explained by the following equation, the accuracy of which I have determined by crystallising the salts from alcohol and testing the crystals so obtained:—

$$2NH_4Cd_2 2NH_4CdI_2 2NH_4CdI_2 + 3NH_4Br = NH_4BrCdBr_2 + 4NH_4I;$$

that is, three molecules of ammoniac bromide, (29·4 proportions by weight) added to one molecule (69·2 parts) of twofold ammoniac-cadmic iodide sets free four molecules (58 parts) of ammoniac iodide, and forms simultaneously one molecule 37·9 parts of twofold ammoniac-cadmic bromide. (In drawing up the equation I have, for the sake of simplicity, omitted the water contained in the double salts, but in the numerical explanation it is taken into account.)

E. Corresponding to which a collodion was prepared by mixing three volumes of raw collodion with a solution of 2·2 grains of twofold ammoniac-cadmic iodide and 0·3 grains of ammoniac bromide in fifty cubic centimetres of alcohol. The result was a collodion containing 0·39 grains crystallised ammoniac-cadmic bromide, 1·5 grains twofold ammoniac-cadmic iodide, and 0·6 grains ammoniac iodide. This collodion resembles *B* very closely, and was produced at the same time, as one got the same iodiser with different salts. The comparative examination of the collodions showed that *E* as well as *B*, *C*, and *D* are from one-sixth to one-seventh more sensitive than *A*. There was no appreciable difference to be observed between the sensitiveness of *B*, *C*, *D*, and *E*; on the contrary, *B*, *C*, *D*, and *E* are much sooner coloured than *A* (?*B*, *C*, and *E* agree in this with the ordinary portrait collodions with ammonium and cadmium salts, and this rapidity increases with the ammoniac-iodide contents).

From that I can lay down the following rules as generally applicable:—

1. Collodions containing twofold ammoniac-cadmic iodide and single ammoniac-cadmic bromide, or containing ammonium or cadmium salts in the proportion of these double salts, are, if one wish at the same time to have great durability, the most sensitive collodions; and by increasing the proportion of cadmium, as shown by a series of experiments, they gain in durableness, though not nearly in the same ratio as they lose in sensitiveness. The addition of ammonium salts increases the sensitiveness at considerable cost (about one-fifth) to the durability.

2. A proportionately less excess of ammoniac iodide makes the collodion from one-fifth to one-sixth more sensitive, but also less durable, because *free* ammoniac iodide is subject to much quicker decomposition in collodion than that which has combined with the cadmium iodide to form the double salt.

3. A greater addition of free ammoniac iodide does not make the collodion appreciably more sensitive than the smaller; on the other hand, the collodion decomposes more readily in proportion to the increase of ammoniac iodide.

4. The free ammoniac iodide in excess is not added in that form, but, in order to avoid using the unstable ammoniac iodide, ammoniac bromide and twofold ammoniac-cadmic iodide are employed, which set free ammoniac iodide in forming ammoniac-cadmic bromide. This can only be done in the case of collodions (portrait collodions) containing a great deal of iodine in proportion to the bromine, because the use of much ammoniac bromide sets free a great deal of ammoniac iodide, by which the collodion is made more liable to decomposition. Collodions rich in bromine—for example, landscape collodions—are produced with iodine and bromine double salts only. For collodions which are to contain bromine *only*, single ammoniac-cadmic bromine is especially suited.

JOSEF MARIA EDER.

(To be concluded in our next.)

PHOTOGRAPHY IN COURT.

LOCK AND WHITFIELD *v.* LEE.

At the Court of Exchequer, on the 15th inst., an action was brought by Messrs. Lock and Whitfield, photographers and miniature painters in Brighton, and Regent-street, London, to recover £37 4s., the value of a portrait of the defendant's wife. The defence was that the portrait was not satisfactory, and could therefore be returned in accordance with the agreement entered into between the parties.

Mr. Montague Chambers, Q.C., and Mr. W. G. Harrison were council for the plaintiffs; Mr. Fullerton represented the defendant.

Mr. Chambers, in opening the case, stated that the plaintiffs were eminent artists of upwards of twenty years' standing, and were patronised by the Queen and other members of the Royal family. Nothing was said at the time of the agreement in reference to the defence now set up, namely, that if it did not give satisfaction it might be returned. The lady sat several times, and her husband (a Staffordshire ironmaster) more than once accompanied her. The picture of *The Blonde* seemed to have been selected by the lady as the model for her portrait. The former represented a beautiful young girl, in a light dress, sitting at the seaside, with her hat and feather thrown carelessly behind her. Various interviews took place between Mr. and Mrs. Lee and the artist in Regent-street, and several alterations in the portrait were suggested and carried out. Ultimately it was completed and sent home, but was returned for the reasons stated, besides the objection that it was not a likeness of the original. It was impossible, observed the learned gentleman, for an artist taking a likeness to make a middle-aged matronly lady look like a beautiful young girl, blushing as a bride, and with a face beaming with delight and childlike innocence. After the picture was returned Mr. Lock had it criticised by some of the best artists, especially for the sake of his own reputation, and the result of that inspection was that it was pronounced an admirable painting and rather a captivating likeness.

Mr. Higgins, the plaintiffs' business manager at Brighton; Mr. Lock, the artist himself; and Mr. Gush, an artist in London, gave evidence in support of the above statement.

Mr. Fullerton, in opening the case for the defendant, stated that Mr. Higgins had persuaded Mrs. Lee to have a portrait executed, and expressed his opinion that Mrs. Lee would come out exceedingly well in the style of coloured photograph, with a distinct agreement that if the effort were not successful no charge should be made. Upon this understanding photographs were taken, and the sittings were given by Mrs. Lee. When the picture reached Mr. and Mrs. Lee, at Downside, near Leatherhead, they did not wish to rely upon their own opinion, and the picture was therefore exhibited for some time in their house for their friends to state their opinion in reference to it. The result was that it was unanimously disapproved of by them all.

Mrs. Lee was examined at some length in support of the statement of the learned counsel. She said the picture, instead of being a water-colour drawing, as promised, was a very badly coloured photograph; and her friends told her that it made her look much older than she really was.

Mr. Lee's objection to the portrait, as he stated in evidence, was that the cheeks were so red that it gave the appearance that they had been rouged. The surroundings of the picture had not at all the appearance of a water-colour drawing, but of a badly-coloured photograph. The bosom was of so dark a colour that it more resembled the skin of a mulatto than of a fair-skinned English woman. The lines about the mouth and around and under the chin gave a very different appearance from that of the portrait of the original. The chin especially was made to look "jowly."

The learned judge having summed up at some length, the jury, after having retired for a few minutes, returned a verdict for the plaintiffs.

Judgment was given accordingly.

The *Daily Telegraph*, commenting on the above case, says that it illustrates in a curious degree the difficulties with which artists have to contend in suiting their sitters. After a brief recapitulation of the circumstances of the case, our contemporary says:—"They (the defendant and his wife) did not like the portrait when it was sent home; but, resolved not to rely upon their own opinion, they called in some friends as judges, and 'the result was that it was unanimously disapproved of by them all.' The lady herself was examined, and said that the picture, instead of being a water-colour drawing, was a badly-coloured photograph, and that 'her friends told her that it made her look much older than she really was.' As for the defendant, that gentleman's objection to the portrait was mainly to the effect that the cheeks were so red that

it gave them the appearance of having been rouged. But what would the gentleman have said to one of Mr. Millais' thousand-guinea portraits, in which carmines are applied to the cheeks and lips with a liberality far more suggestive of the celebrated 'bloom of Ninon de l'Enclos' at eleven-and-sixpence a bottle than of the subdued carnations of 'Madre Natura?' Another of the defendant's objections was that his wife's neck in the picture was of so dark a colour that it more resembled the skin of a mulatto than that of a fair-skinned English woman. But may not the exigencies of the law of shadows have had something to do with the adumbration of the lady's flesh tints?

"We are well aware that shadows in portraiture are often an inscrutable mystery to many otherwise well-educated persons. When Queen Elizabeth sate to Zucchero she desired to be painted 'neither with shades to the right nor to the left, but in an open garden light;' in other words, her Majesty's evident preference was for having her countenance depicted, sciographically speaking, in the similitude of a muffin. Again: when Lord Amherst's embassy visited Pekin, and the mandarins were shown a portrait of George III., which was destined as a present for the Emperor of China, and the features of which were in half-shadow, a Celestial critic asked why the King of England had one side of his face covered with dirt? What would the hypercritical mandarin have thought of a 'Rembrandt?' Into the further objection of the defendant at the trial on Saturday, that his lady's chin was made to look 'jowly,' we are deterred by reasons of gallantry from entering. A fish has a 'jowl,' and very nice indeed is that part of the anatomy of a salmon and a turbot; but for a lady to be 'jowly' must be accounted a simple impossibility. Perhaps it was the inexorable canon of foreshortening that did the mischief. The sun draws upturned maxillaries more correctly, although less flatteringly, than Guido did; and we are afraid that the beauteous neck of Cleopatra, if viewed through the medium of the lens, might harbour a slight suspicion of 'jowliness.' The jury in this case were not in a position to enter into such minute matters of technical analysis and comparison; and, the learned judge having summed up, they returned a verdict in favour of the plaintiffs for the full amount claimed. We have not the slightest doubt that the defendant will be exceedingly dissatisfied with the result, nor can we withhold our sympathy from a lady whose husband has been adjudged to pay £37 odd, to say nothing of costs, for a picture which he does not like, and which his friends unanimously declare to be an unsatisfactory counterfeit of his wife.

"The real question at issue, however, was obviously, not whether the picture was a faithful or flattering portrait, but whether it had been executed in a proper and workmanlike manner. Sitters have been systematically dissatisfied with their portraits for the last five thousand years at the least; but there has in all times existed a common consensus among experts as to the modes of ascertaining whether a picture reaches the due standard of artistic capacity and manipulative efficiency. To be worth the price demanded for it, a painting must be 'up to the mark,' and the real question to be decided in the case which we have discussed was whether the portrait was a well-executed work of art or a daub. The evidence of the experts seems to have been decisive enough as to its not having been a daub; and the long and brilliant reputation of the firm of photographers and miniature painters who were plaintiffs in the action should surely be regarded as well-nigh tantamount to a guarantee that no daubs would under any circumstance be allowed to leave their establishment. As to the fidelity of resemblance the dilemma remains as embarassing as ever; and, looking at the difficulties so frequently arising between portraitists and their sitters, it would be almost as well if the former took a hint from the worldly wisdom of the French photographer, who advertised a sliding scale of charges for his productions. 'Guaranteed resemblance 20f.; pleasing resemblance, 10f.; *air de famille*, 2f. 50c.' The charmingly vague generalisation of a 'family likeness' might be accepted as satisfactory to both artist and model."

Our Editorial Table.

British Manufacturing Industries.

London: Edward Stanford.

The volume about to be noticed is one of a series the object of which is "to bring into one focus the leading features and present position of the most important industries of the kingdom, so as to enable the general reader to comprehend the enormous development that has taken place within the last twenty or thirty years." A variety of topics are comprised in the series; but those embraced in the volume before us are respectively on *Paper*, by Professor Archer; *Printing and Bookbinding*, by Joseph Hatton; *Engraving*, by the late Samuel Davenport; *Photography*, by P. Le Neve Foster, M.A.; and *Toys*, by G. C. T. Bartley.

In Mr. Foster's contribution—which more particularly claims our attention at present—that gentleman judiciously confines himself to giving a popular sketch of the leading features in photography as practised at the present time, and the bearing it has on the arts. No attempt is made to write a treatise on photography, and those who desire to practice the art are referred for the necessary details to special manuals on the subject.

With reference to certain statistics quoted by Mr. Foster, obtained from the last census, we imagine that the census returns must have been seriously defective in some details. In 1871, when the census was taken, although the total number of females employed in photography in the United Kingdom is entered as 694, we imagine this very inadequately represents the real numbers employed—not at the present time, but five years since. Again: the statement—for which the census returns must also be held responsible—that there are only seven makers of photographic apparatus must surely be taken *cum grano salis*, for the advertising pages of our Almanacs have long ago told a very different tale. Mr. Foster recognises the imperfection of the official returns, and truly enough says that the numerous trades and occupations dealing in the materials with which the photographer works are legion.

An outline of several of the photographic processes is given so as to convey to the non-technical reader a good idea of the subject of photography in its various branches without going into working details, which, as we have already stated, is foreign to the intention of the author. In this way are passed under review the wet and dry collodion processes both with bath and emulsion, the gelatino-bromide, carbon, Woodbury, photo-engraving, photolithographic, phototypographic, and other "processes" with which the art-science teems in such a prolific manner.

On the whole, we could not recommend a better work than this for affording to the general public sound information on the progress and present state of photography.

The other topics comprised in this volume, especially those of *Engraving*, by Mr. Davenport, and *Paper*, by Professor Archer, must form subjects for future observation.

Photo-Tints.—By B. J. Edwards and Co., 61, Fleet-street.

The readers of this Journal have for a considerable period been aware that pictures of a class denominated "photo-tint" were being produced by the firm whose name stands at the head of this short article. But, in these days of rapid progress in photography, when new processes are ever and anon coming to the front, the first and most natural question that is put when a new specimen meets the eye, and a query which has been several times addressed to us in relation to the process of Messrs. B. J. Edwards and Co. is, "*what* is photo-tint?" We answer this by giving a brief quotation from a circular which accompanies a number of specimens of the process, and in which we are informed that "the new process introduced by Messrs. B. J. Edwards and Co., under the name of photo-tint, is the latest and best method of mechanical printing in permanent ink by means of photography. Prints produced by this process possess a transparency and delicacy of half-tone not approached by any other mechanical prints, and not surpassed even by the finest silver or carbon prints. Photo-tint is, therefore, specially adapted for portraits and views." Thus far we have given our definition in the language of the firm themselves.

At first sight we were inclined to rank photo-tints in the category of *Albertypes* or *lightdrucks*, to the finest examples of which they bore a resemblance; but upon a closer examination we found that there was a well-marked point of difference; for the shadows and demi-tints, instead of being composed of a solid, uniform colour, presented on examination with a strong magnifying-glass a finely-granulated surface, by which blocking-up of the shadows would seem to be rendered impossible. It is to this cause that we attribute the transparency and admirable *chiaroscuro* we find in these examples of photo-tint.

The specimens embrace reproductions from oil paintings, from pencil drawings, from pottery, silver plate, sepia drawings, statuary, and, lastly from nature; and it is due to the process and the workers of the process to here state that we have rarely seen finer examples even by silver printing.

Chromotypes.—By The Autotype Company.

It will be remembered that in our report of the recent meeting of the South London Photographic Society, which appeared in our last number, we said that Mr. Foxlee exhibited a large and very fine collection of carbon prints by the chromotype process, the work of the Autotype Company and others. These were undoubtedly the finest carbon prints we had ever seen. When conversing with Mr. Foxlee, at the close of the meeting, we were assured by that gentleman that such

a high degree of perfection had carbon printing now attained, in the hands of the Autotype Company at least, that from any negative of average quality he would undertake to produce a *much finer* print in carbon than the most experienced printer could produce in silver from the same negative. Knowing Mr. Foxlee's experience and sound judgment we readily accept the statement.

As if to corroborate the remarks we made respecting the quality of the prints spoken of, we have been favoured by the Autotype Company with several specimens of chromotypes, which, if possible, surpass in excellence those that had previously elicited our encomiums; for there is a delicacy and peculiar charm about these carbon prints which we have seldom, if ever, seen equalled in silver prints. The tones are rich and deep, and the high lights are exceedingly pure, while the middle tints possess a peculiar and charming degree of transparency.

As we have hinted, the style in which these carbon portraits—which are both of *carte* and cabinet dimensions—is printed is that now well known as the "chromotype," and too much praise cannot be bestowed upon M. Lambert, who brought to such a state of perfection his method of producing portraits of this class, and who so assiduously, while in this country, employed himself in making the system known.

The specimens before us are of two kinds—one having a surface as fine and glossy as enamel, the other with a surface more akin to that of double albumenised paper. It will afford us much pleasure to show these charming photographic productions to any who may call at our Publishing Office, for we are assured that, unlike many other photographic "things of beauty," the beauties inherent in these will be further enhanced by the knowledge that, humanly speaking, they will also prove to be "joys for ever." In these pictorial gems carbon printing has achieved a great triumph.

ANSWERS TO CORRESPONDENTS.

☞ *Correspondents should never write on both sides of the paper.*

C. A. Ferneley.—Thanks.

James Thomson.—Received.

A. Brothers.—Thanks for friendly communication.

J. C.—We should select either of the two first on your list—those respectively at £5 10s and £6. It is probable that the latter will prove superior to the other.

M. H. A.—The luminosity of the gas flame can be greatly increased by causing the gas to impinge upon felt saturated with benzole just before the gas issues from the jet.

P. M. D.—The surface markings will be got rid of by adding sufficient tincture of iodine to the collodion to render it of a deep sherry colour. Of course the silver bath must also be in good order.

J. P. Procter.—The negative is very much under-exposed. Remove the flocculent matter by filtration. It is probable that an improvement would be effected by the addition of more protosulphate of iron.

W. E. S. T.—The temperature of the acids ought to have been allowed to fall to 150° Fah. before immersing the cotton. The higher the temperature the greater is the tendency of the acids to dissolve the cotton.

Experimenter.—Starch, gelatine, and albumen all produce a different tone. You do not appear to realise the fact that albumen contains sulphur, which, during the putrefaction of the albumen, yields sulphuretted hydrogen. This is the chief source of the offensive smell of "rotten" eggs.

T. Johnson.—It is only necessary that the oil painting be placed in such a manner as not to reflect light from its shining surface into the camera. This you can ascertain by looking at it from the position the camera is intended to occupy, and giving it an upward or downward slope till it be clearly seen.

Obliged Reader.—The markings on the negative are caused by the use of a collodion that is too horny and repellant. It is probable that this tendency may be cured by mixing with it a small proportion of old and "rotten" collodion. At anyrate this will mitigate the evil of which complaint is made.

A Fulham Amateur.—A vignetting glass is not requisite in printing a vignette. A piece of cardboard or stout brown paper, having cut in it an aperture of suitable dimensions, answers the purpose quite well, provided it be placed a little distance in front of the negative, and the printing conducted in diffused light.

Geo. B. Brown.—"Which is the best dry process?" Alas! neither we nor anyone else can furnish a reply to your question that would prove satisfactory, and for this obvious reason—each photographer believes that process to be the best which in his hands yields the best results; and the number of processes which rank under this category is legion.

Micros.—It is generally believed that the structure of all diatoms of the order *Navicula* and *Pleurosigma* is somewhat similar, and that the form of the cells is hexagonal. An object-glass of an eighth of an inch in focus will answer for producing photographs of *P. Angulatum;* but it must be used with an "amplifier," or an achromatised concave lens placed at the eyepiece end of the tube of the microscope.

Opticus.—Nay, we have not said that the method of ascertaining the equivalent focus of a combination by focussing an image to the exact dimensions of the original, and then dividing the distance between these two extremes by four, is *absolutely* correct; but we have certainly said, and here repeat the assertion, that this is an excellent way of ascertaining *approximately* (not absolutely) the equivalent focus.

A Landscapist.—The registration of a photograph does not prevent anyone who chooses from taking his camera to the precise spot from which such photograph was taken and obtaining a number of negatives from that point of view. All that registration effects is the prevention of anyone copying the *picture* itself that has been registered. You have discovered that a particular artist obtained a famous photograph by placing his camera in a loophole of a certain castle. Well, you are also quite at liberty to place your camera in that same loophoole and do your best to imitate or even surpass the artist by whose skill the original picture was produced; but you must not place the original picture before the camera.

Brightonienses.—The reflecting stereoscope has long been a thing of the past. We strongly advise you *not* to make one, but to have, instead, a lenticular stereoscope, which, we know from experience, will afford you far greater satisfaction than one of the Wheatstone kind. It is quite a mistake to suppose that your large negatives will be more usefully employed when yielding proofs for a 10 × 8-inch reflecting stereoscope than for one requiring pictures only three inches square. To enter into this subject in full detail would require more space than we can devote to it in this page. If you call, by appointment, we shall be happy to see you at our editorial office and willingly give you the fullest *viva voce* information.

Auld Reekie.—In order to copy an engraving in such a way as not to show the texture of the paper, the best way is to lay it down upon a table in an open, diffused light, and then take a negative by means of a camera placed vertically, or by means of a rectangular prism or mirror placed outside the lens if the camera be retained in its usual horizontal position. In the former case the negative obtained will be one of the usual kind; in the latter it will be a "reversed" negative—one of the class required for carbon printing by single transfer, for Woodburytype, collographic printing, and other purposes. The particular position of the picture here recommended ensures freedom from the granularity arising from the texture of the paper.

Carl Foscher.—It is a bad method to use a portrait lens with a diaphragm for taking views when a photographer has access to a landscape lens. The circular luminous spot in the centre of the picture arises from the lens, and is known as "flare." To provide a remedy, so long as you use the present lens, is hopeless; for unless the relation of the front to the back lens were altered either by lengthening or shortening the tube the flare spot will still appear. The true remedy consists in using a single landscape lens, which should be achromatic and meniscus. If we had an opportunity of examining the portrait lens we could speak more definitely concerning the possibility of having the flare spot eliminated without sacrificing the other good qualities of the lens; but without such examination we cannot offer any opinion.

The Philadelphia Exhibition.—The number of photographs contributed to the Centennial Exhibition is said to be very great, and the quality such as to elicit the highest praise. Such accounts as we have seen have as yet only taken cognisance of the works of American artists; but in the course of a week or two we hope to present a detailed notice of the work both of home and foreign photographers. A series of pictures by Landy, of Cincinnatti, is highly spoken of; but of these, as well as other works of photography, we shall have more to say hereafter.

Royal Cornwall Polytechnic Society's Prizes.—We have received the prize list of this energetic Society, and find that, as formerly, silver and bronze medals are offered for the best landscapes and portraits, according to a detailed statement that has been issued. This statement has reference to the productions of professional photographers only, to whom ten such medal awards are offered; but amateurs are not "left out in the cold," for to this class the announcement is made that "medals and prizes are offered by the Society for meritorious productions in this department." All requisite information can be obtained on application to the Secretary, Mr. Edward Kitto, Falmouth.

LONDON GAZETTE, *Friday, June* 16, 1876.

Partnerships Dissolved.

J. A. Forrest and Co., Liverpool, glass merchants.

METEOROLOGICAL REPORT,

For the Week ending June 21, 1876.

Observations taken at 406, Strand, by J. H. Steward, Optician.

These Observations are Taken at 8 a.m.

June.	Bar.	Wind.	Wet Bulb.	Dry Bulb.	Max. Tem.	Min. Tem.	Remarks
15	29·93	SW	54	61	66	49	Cloudy
16	29·82	N	51	54	65	49	Dull
17	29 92	SW	52	56	65	49	Dull
19	30·18	SW	54	58	77	49	Fine
20	30 08	E	64	72	84	56	Fine
21	29·93	E	65	72	85	61	Fine

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THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 843, Vol. XXIII.—JUNE 30, 1876

CYANIDE OF POTASSIUM.

If the experience in cyanide of potassium of the writer of the pathetic ballad of "Mister William Baker, *carte-de-visite* taker," had been confined to the sample that we have lately been much using, it is very doubtful whether he would not have changed the relative positions assigned to the "hypo." and cyanide which are introduced in connection with the contemplated suicide of the too-susceptible portraitist. How much of a solution of ordinary weighed strength one might swallow with impunity it is not easy to predicate; but the cyanide of potassium which requires that the strength given in the usual formulated tables for fixing solutions be increased four-fold ere it perform in an effective manner the duties incumbent upon and expected of it cannot reasonably be assigned a high position in toxicology. But it is not with the effects of cyanide of potassium upon the system that we have to do at present, but with the solvent action it exercises upon the iodide and bromide of silver. It is photographic, rather than physiological, "fixing" in which we are now interested.

To the credit of manufacturers of photographic chemicals let it be recorded that the salts of the noble metals are seldom, if ever, adulterated. The nitrate of silver and chloride of gold of commerce, especially the former, are marvels of purity when the price at which they are sold and the small profit left to the dealer are considered. But other chemicals—cyanide of potassium in particular—are subjected to adulteration, and, in the case of the chemical named, to sophistication to a very serious extent. We do not blame the manufacturers of photographic chemicals for this state of things; it is very probable that few of them have engaged practically in this branch of chemical manufacture, and that its preparation is still in the hands of those who first undertook it in connection with electro-metallurgical purposes. Be this as it may, there is much cyanide of potassium to be met with containing impurities to the extent of more than seventy-five per cent., the principal agent used in the adulteration being carbonate of potash.

We are well aware that it is almost impossible to obtain cyanide in a state of absolute purity; but so long as the adulteration does not much exceed ten per cent. no fault whatever need be found, and this degree of purity can be obtained by manufacture, and even in commerce, although in the latter case with some degree of difficulty.

There are definite tests by which the purity of the cyanide can be ascertained; but previous to indicating them we shall give such hints as will enable the reader to prepare for himself cyanide of potassium of a degree of purity not inferior to the best commercial samples. The value of these hints will probably be best appreciated in those localities where, owing to their distance from large towns, to the operation of the Poisons' Bill, to a want of demand, or to any other cause, a difficulty may be experienced not only in obtaining cyanide of potassium of a reasonably good quality, but in obtaining it at all.

The process associated with the name of Liebig, although first published (in 1834, in the *Philosophical Magazine*) by Messrs. Rodgers, is that which is generally adopted for manufacturing cyanide of potassium for all purposes except a few in which nearly absolute purity is required—for instance, in the preparation of cyanide of hydrogen (hydrocyanic or prussic acid), in which the cyanate and carbonate of potassium present operate prejudicially; but for photographic purposes as well as for those of electro-metallurgy it will be found to yield an excellent article.

Take a quantity of the common yellow prussiate of potash (ferrocyanide of potassium), and having crushed it to a fine powder, dry it over the fire or a gas flame upon a metallic plate, stirring it occasionally with a spatula or an old table knife, so as to prevent it from forming a cake. To eight parts of this add three parts of carbonate of potassium which has also been crushed and dried. Mix these well together and pour them into an iron crucible (a saucepan has been successfully improvised for the purpose) previously heated to redness. Let a good fire be maintained and the crucible covered, and fusion will soon take place. Stir this liquid mass with an iron rod occasionally during a period of fifteen minutes, after which time observe if the liquid cool upon the rod to a white or light gray mass. When this is the case pour out the contents upon an iron slab, and when cold break up and put into a bottle. The cyanide of potassium thus obtained contains rarely more than twenty per cent. of impurity mainly in the form of cyanite of potassium. The following statistics are those of Mr. James Napier, F.C.S.:—Fifty-five pounds of yellow prussiate and nineteen pounds of carbonate of potassium, after being dried, weighed respectively forty-eight pounds and eighteen pounds—in all sixty-six pounds of the dry mixture. This yielded thirty-eight pounds of *clean* cyanide which was poured out, and six pounds more from the sediment in the crucible, which, after being scraped out, was dissolved in water. This latter was of inferior quality to the other, but sufficiently good for ordinary work.

To test the quality of cyanide of potassium: while a "rough and ready" way is to make a ten-grain aqueous solution, and note its solvent, or fixing, effects when poured upon a sensitised collodion plate, the more elegant and scientific method of Duflos will be adopted by those who desire to proceed with accuracy:—Nitrate of silver mixed with a small quantity of ammonia to such an extent that the liquid after precipitation may be rather acid than alkaline is dropped into the cyanide solution so long as any precipitate of cyanide of silver is produced; the precipitate is dried and weighed, and 134 parts of cyanide of silver indicate twenty-seven parts of anhydrous prussic acid. It is probable, however, that the method employed by the electro gilders and platers of Clerkenwell and Birmingham is the readiest of all; by its means the proportion of cyanide of potassium in any solution is ascertained. Nitrate of silver dissolved in distilled water is placed in a common test tube or alkalimeter graduated in 100 parts, the proportion being such that every two graduations of the liquid shall contain one grain. A given quantity of the plating solution is now taken—say one ounce by measure—and the test solution of nitrate of silver is added to it by degrees until the precipitate formed ceases to be redissolved. Note now the number of graduations, and the following equation (*Napier*) gives the quantity of cyanide:—Every 175 parts of nitrate of silver are equal to 130 of cyanide of potassium in solution. Suppose twenty graduations were taken—equal to ten grains of nitrate of silver—then 175 : 130 : : 10 : 7.4 grains of free cyanide of potassium. There are other methods, but these will suffice.

We have only to add to the foregoing that cyanide of potassium is sold in London at prices varying from eighteenpence to five shillings per pound. We have tried numerous experiments with both the best, the worst, and a sample of intermediate quality. We sum up all our experience with these different samples by emphatically endorsing the correctness of the old maxim of *Poor Richard*—"At a cheap pennyworth pause awhile."

ON FACES.

A recent trial in the Court of Exchequer possesses an interest to photographers far greater than at first appears—not so much from the element of ridicule imparted to it by the daily press, but from the grave issues involved, which, there is great reason for congratulation, bore mainly in the direction of photographic interests—issues which we may be sure will, before many months are over, be sought out as precedents in many a similar case. There is no need to dwell upon the particulars, for they must be fresh in the recollection of our readers; it only behoves us to see if we cannot learn a lesson from them, and derive more or less of instruction of a practical nature from the various points raised.

That a sitter should not be pleased with a portrait is unfortunately far too common an event to be worthy of comment; but when a sum bordering on the amount of fifty pounds is in question the matter becomes serious, and every one would naturally endeavour to fortify himself against any possible loss which might accrue in commissions of a similar nature. Two courses readily suggest themselves as being most natural:—First, to take such precautions of a legal character as would enable the artist to obtain his money if the work were done to his own satisfaction; and, secondly, so to increase his own skilfulness as to reduce the chances of failure to a minimum. That the latter method is far from common many would at once assert. But in what does skilfulness consist? If in fidelity or representation of certain solid forms nothing would be needed but the closest adherence to a carefully-taken photograph.

Now as, practically speaking, the camera cannot err in that respect it is evident something more is wanted, for common experience tells us that very many simple photographs, technically good though they may be, are the very opposite of excellent likenesses. We are, therefore, forced to go further afield to discover the elements of skill; and the more the subject is considered the more will the conviction grow that success in portraiture, alike to the photographer and the painter, consists in obtaining by all legitimate means—we would not say that illegitimate means, æsthetically speaking, should not be used—the best possible compromise between a face as it is and a face as it is supposed to be. This is no truism, neither are we using convertible terms.

If anyone desire to know what his friend's countenance is like let the last thing he does be to look at that friend's face in the living reality; let him stand by his side and look at the reflection in a mirror. In nine cases out of ten he will be surprised beyond measure. That loved face that he thinks he knows so well, and every feature of which he is sure is familiar to him, appears there as such a drolly-crooked, misshapen image that he is certain the mirror is defective, every lineament is so distorted; and more than once has a mathematical explanation, based on the laws of optics, been given to make clear why plain mirrors should distort one's features when viewed obliquely. But the cause is not so occult. It is, as we say, simply the case that the features are seen as they are and not as they are thought to be. Every object that is repeatedly looked at loses something in the viewing; and if its shape at all approach regularity of outline it will, ere long, appear to be symmetrical in all its parts. And thus it is with the human features. A symmetrical face (that is, one even and exact in measure on each side of a line run from forehead to chin) is a great rarity—almost a *lusus naturæ*.

There is scarcely a face in creation which could stand the ordeal of a two-foot rule or callipers; yet few, very few, of a photographer's or a painter's sitters are aware of this fact. No one looks at his father, or his mother, or his sister, or his sweetheart's face with the deep scrutinising glance that he bestows on the familiar *carte* or the old glass picture in a case; and so those departures from symmetry are, until the fatal picture is taken, positively unknown, except in the more grossly-evident cases.

If our words appear to require confirmation anyone of our readers has only to place himself before a mirror and observe in it the first half-dozen of *familiar* faces to be at once assured of the correctness of our remarks. The truth of the facts we indicate is well known in painters' studios. It is a very uncommon thing for them to paint a portrait out of hand; they generally prefer to place it face to the wall for a while, and then bring it nearer to perfection by gradual and distant stages to avoid that familiarity which breeds, not contempt, but blindness—of a sort.

It will be in the recollection of many of our readers how much more frequently a sitter in the good old glass positive days used to be pleased with his own pictures than is now the case. The interesting novelty of the process has been alleged as the cause. It had something, but a very trifling something, to do with the matter. The real cause is thus explained:—In the glass picture viewed film upwards he sees himself as *he* is in the habit of seeing himself—that is, as in a looking-glass—reversed. Hence he does not perceive the want of symmetry in his own countenance any more than he does his friend's faces as he sees them usually—that is, non-reversed; but the moment the glass picture is shown him film downwards, or he sees his own *carte* on paper—non-reversed as to reality, but reversed as to his own knowledge of himself in a mirror—he finds fault with it, for he sees it in an entirely new position, and so his perceptions have not time to become dulled before he forms his judgment.

Another proof of our proposition is found in the common practice of artist-painters to examine their work, when copying a picture or producing a delicate miniature, by means of a mirror; defects then reveal themselves which would otherwise have escaped notice.

So far we have only attempted to establish our position that faces are crooked and their owners and their owners' friends do not know it. The next point to consider is the means of making practical use of this knowledge, and teaching us, in point of fact, how, in a measure, to legitimately deceive one's sitters. This can only be accomplished by judgment, study, and practice. The first thing to be done when a sitter enters the studio should be to narrowly scrutinise his features, getting him, by excuse or of set purpose, to turn his head this way and that way, so as to take in all its salient points. A quick eye, aided by a practised judgment, will soon inform the operator what phase of the face and what light will suit. Usually, even with obstinate-minded sitters, it will not be difficult for the artist to have his own way in the matter, and then the result is simply a proof of the possession or want of skilfulness in the operator. He, in a few minutes of time, has to observe the three leading unsymmetrical characteristics of the majority of faces, viz., to which side the obliquity of the nose tends, which is the smaller eye, which side of the mouth is the smiling side, and also what is the required pitch of the head to avoid the extremes of sinewy ropiness or a double-chinned protuberance of the neck, not to say the "jowliness," *et hoc genus omnis*, lately rendered so familiar.

The operator who bears all these points in mind, or the artist who follows this lead, will be sure to deserve and to gain success; and to all lovers of art in the works of a photographer attention to such points will further his wishes, for they demand time, and time being money higher prices would rule with advantage to the public and the photographer. The artist who had to use the photograph as the basis of his work would find his share of the work facilitated in a degree that would at once gratify him, and lead to still further efforts in his own province.

FORTHCOMING PHOTOGRAPHIC EXHIBITIONS.

From announcements which have already appeared in our advertising columns it will have been seen that the Edinburgh Photographic Society has determined upon holding an exhibition—its maiden effort in this direction.

It is now many years since a photographic exhibition has been held in Scotland; indeed, not one has taken place since the days of the Photographic Society of Scotland—a body which has been

defunct for more than a dozen years. The last exhibition in the "Modern Athens" was held in 1861-2, and so little was it appreciated that our then correspondent was led to remark in one of his notices that, "judging from the scanty attendance of visitors, the Edinburgh public do not seem to be aware of this collection of pictures in their midst." So far as we know the gentlemen composing the managing body of the Edinburgh Photographic Society there does not seem the smallest danger, under their management, of the public being now permitted to lapse into the apathetic, *insouciant* state experienced in the days of the then moribund Society under whose ægis the last exhibition took place.

On the subject of medals we have erewhile expressed in unmistakable language our opinion of the value of such awards. The deceased Society to which we have just referred rendered itself very ridiculous in the eyes of many by the objectionable principle on which it awarded its medals. It is with regret, therefore, we find the younger body committing itself to the presentation of medals; for, although we have no fear that the Edinburgh Photographic Society will fall into similar errors as its predecessor, yet we feel assured from experience, both in connection with the late Photographic Society of Scotland as well as with the Photographic Society of Great Britain, that mischief arises from these medal awards. On this subject we are entirely at one with our editorial predecessor, Mr. George Shadbolt, who, writing on this subject in 1863, said:—"Our readers are most of them fully aware that we do not advocate the principle of presenting medals to exhibitors at our photographic exhibitions. We believe it to be inherently fallacious, and not conducive to progress."

From a private letter received from Dr. Nicol we learn that the medal question has given rise to some strong discussions in the society of which he is Corresponding Secretary; but this is only what was to have been anticipated, viewed in the light of past and recent experience. We are glad to find that the evil results—should the consequences partake of this character—arising from the adoption of the medal system will be minimised by the local *hors concours* that has been adopted. We, therefore, bespeak for this the first exhibition of the Edinburgh Photographic Society the hearty co-operation of photographers, not only throughout this country, but in America and on the European continent. The pictorial works which will grace the walls of the forthcoming exhibition will be seen to much advantage and leisurely examined, in one of the finest rooms in the country, by an assemblage every way qualified to appreciate the beautiful in art and what is novel and useful in connection with photographic apparatus.

While on the subject of exhibitions we may remind our readers that the Annual Exhibition of the Photographic Society of Great Britain will be held very early this year, namely, on September 8th; hence intending contributors must lose no time in the preparation of their pictorial works for this important annual display of photographic art-treasures.

NOTES ON THE SENSITIVENESS OF SILVER BROMIDE TO THE GREEN RAYS AS MODIFIED BY THE PRESENCE OF OTHER SUBSTANCES.

Several investigations made at different times during the past years on the sensitiveness of silver bromide to rays of different refrangibilities led me to the conclusions—1st, that its sensitiveness to the different rays could be distinctly modified (increased or diminished) by the presence of various bodies, coloured and colourless; 2nd, that no relation could be traced between the colour of the modifying body and the refrangibilities of the rays to which the sensitiveness was modified. During the past winter I have carefully re-examined the question, which is an important one both in its theoretical and practical relations, and have found my conclusions in all respects confirmed; and I have, during the past winter, been occupied with a single portion of the subject, namely, the action of the green rays, as a special study.

In this investigation I have pursued the same general method as before; that is, I have used coloured glass whose transmitted rays have been carefully studied with the spectroscope. There is no doubt in my mind that this method of examination is capable of giving results as valuable as those obtained by the use of the spectrum. It may be said, in fact, that the subject requires for its full elucidation the use of both methods. To those who may imagine that the results of the exposure to the spectrum are the more reliable it may be interesting to have specified the weak points of that method.

The *relative strength* of the impression produced by different portions of the solar spectrum on a sensitive surface will always depend upon the intensity of the light employed and the length of exposure. It has already been proved that silver iodide and bromide are sensitive to every part of the spectrum. It follows that any and every part of the spectrum may be photographed upon plain iodide or bromide if only the exposure be sufficiently prolonged. The longer the exposure the stronger will be the impression produced by the less as compared with the more refrangible rays. Also, it is known that, by a system of masking, Professor John Draper has succeeded in photographing the whole spectrum at once; that is to say, he was able to hold back the action of the more refrangible rays until that of the less was sufficiently strong. The masking was of course done with red or yellow media. Now, when pigments of these colours are extended over sensitive films, what is this but a sort of masking, which retards the action of the more refrangible rays while freely permitting that of the less? Even supposing these pigments to be chemically inert they would check the action of the blue end of the spectrum, and render it possible by a longer exposure to obtain both together. Even a longer exposure would not be absolutely essential; a more powerful or a longer development may take its place, being rendered possible by the diminished impression of the blue end.

If, then, it is alleged that by colouring a film of silver bromide with *red* pigments the sensitiveness to *yellow* rays is increased, we are at once moved to reply that such a result is no proof of a chemical or photo-chemical action exerted by the red pigment; that precisely the same result might be expected if the red substance were chemically inert, or if it were extended over a glass surface and simply interposed in the path of the rays, between the prism and the film, without even coming into contact with the latter. Many results that have been published are liable to this fatal objection. It has been proposed to modify the form of experiment by applying the colour to the front of the plate and exposing on the back through the glass; but even this does not remove the difficulty. The collodion film containing the silver bromide is exceedingly thin, and when moistened very porous and absorbent. Any soluble colour applied, dissolved in water or alcohol, instantly penetrates it through and through, and even moistens the glass under it; and all the colours mentioned by other experimentalists as having been subjected to this experiment are soluble. It is on these results that theories have been based, and they are all susceptible of full and complete explanation in the manner just mentioned.

In matters of photographic experiment, such as these now under discussion, there are always three distinct factors—the sensitiveness of the matter, the force of the impression (depending upon the intensity of the light and the length of exposure), and the development. This makes the investigation difficult and deceptive. If we take two identical sensitive films and submit them to the same exposure we may get quite different results by varying the development, or with an identical film and development by varying the exposure. The amount of error and deception liable to be introduced in this way is known to none but those made familiar with it by experience, and, consequently, for accurate results these sources of error must be eliminated. There is but one way of doing this:—A film must be taken, one portion of which must be washed over with the substance whose action is to be studied, and then the two portions—the plain and that which has been treated—must be simultaneously exposed and simultaneously developed. Both portions must receive the same rays of equal intensity and for an equal time; the development must be made by a bath applied to both portions equally and for an equal time. If these conditions be not maintained the result will be deceptive. The *intensity* of light must be the same and the *duration* of exposure, because the *relative* effect of the different rays will always be proportionate to them. The same plate exposed to the same image for a double time, or for an equal time to an image of double intensity, will give a final result in which the relative strengths are totally different. The relative strength of different parts of the image is also largely modified by the development. I am, therefore, justified in affirming that no strictly comparative trial can be made except the two images on the coloured and uncoloured films be received on the same plate simultaneously and for the same time, and be simultaneously and equally developed.

These conditions have never yet been fulfilled in the case of spectral observations. By the use of coloured glass they may be

maintained with absolute exactness; and when coloured media can be obtained which exclude all but a given band of consecutive rays the effect of coloured substances added to the film of silver bromide, in modifying its sensitiveness to this band of rays, may be accurately fixed. Having previously, with the aid of the spectroscope, determined the exact character of this band I am enabled to speak very decisively of the action of the rays of which it is composed.

In the present investigation I have limited myself to a single question—Does there exist any red substance which is capable of increasing the sensitiveness of silver bromide to the green rays?

For the purpose of this examination I used three thicknesses of very dark green glass, the limiting wave-lengths of which had been many times measured with closely corresponding results. The widest variation was two minutes of arc, which, when it is considered how gradually the band fades out at its borders, and how very faint the illumination is at its extreme limits, is fully as close an approximation as could be expected. The extreme limits of the band, measured to the limit of visibility, were $\lambda497$ and $\lambda581$. But the extremities showed an illumination too feeble to have any effectual result. Cutting off the very faint light the band was reduced to $\lambda517$ on one side and $\lambda569$ on the other, and the rays between these limits may be taken as those whose results were observed.

In order to register the effects produced a glass negative of a suitable character was placed under these three glasses, and under the negative a glass carrying the film, to parts of which the colouring matters have been applied. Complete contact was obtained by a pressure-frame, and the exposure was made directly to the sun. With a good sunlight, in winter, the exposure was about forty-five seconds, corresponding to, perhaps, twenty or less of summer light. The development was in all cases the alkaline, viz., pyrogallol and ammonium carbonate controlled with potassium bromide.

As already said, the main object of the research was to arrive at a solution of the question whether any red pigment could be found which would enhance sensibility to the green rays. The following were tried:—

Ammonium hæmateate.	Murexide.
Santaline.	Aurine.
Coraline.	Carminic acid.
Rosaniline.	Naphthaline red.
Ferric sulphocyanide.	

In addition to these substances of well-established composition some pigments were tried whose commercial names are—

Cardinal red.	Rouge ponceau.
Saffranine.	Bordeaux claret.
Cerise.	

With the single exception of coralline not one of these substances produced the slightest increase of sensitiveness to the green rays.

It was my intention, in the case of finding any red pigments which increased the sensitiveness to green light, to make a careful study of their absorption spectra by means of the spectroscope, but as none such were found except coralline its spectrum only was examined.

The power of coralline, however, to increase the sensitiveness of AgBr to green light cannot be considered as any function of its colour, for two most excellent reasons:—

1. Coralline exhibits a *still more marked tendency to increase the sensitiveness of AgBr to the red ray than to the green.* This action on the red ray was observed and published by me in March, 1875, and completely disproves the theory of any special action of coralline upon the green ray. There appears to be a heightening of sensibility to the less refrangible end of the spectrum, rather than to any particular ray.

2. The action on green light is not a function of the colour of coralline, because *it is easy to destroy that action without destroying the colour.* This singular result is accomplished in the following way:—

Coralline appears to be the ammonia salt of a yellow acid. If we place a drop or two of a weak acid, acetic or gallic, in a capsule, and add a few drops of alcoholic solution of coralline, the deep red colour of the solution passes to a clear yellow. With the addition of more coralline solution the colour reappears with its full brilliancy. But the solution, if too large a proportion of the coralline to the acid have not been added, is found to have wholly lost its power of exalting sensitiveness to the green rays, although the amount of colour applied be made the same in both cases.

Absorption Spectrum of Coralline.—With a moderately-strong solution and a narrow slit the transmitted band is confined to the red rays. As dilution increases the band widens, passes the D lines, and transmits all the yellow rays. In all cases the band is continuous, and shows neither intervals nor a second maximum.

Coralline, then, forms no exception to the general rule, as deduced from the examination of fourteen substances of strong red colouration.

Action of Colourless, or nearly Colourless, Substances on the Sensitiveness to Green Rays.

The following substances examined gave an increase of sensitiveness:—

Potassic arsenite.	Morphia acetate.
Argentic arsenite.	Tincture of capsicum.
Salicine.	Ammonium valerate.
Codeia.	Caffeine (?)

It appears, therefore, that it is not among the coloured, but the colourless, substances that we must look for those capable of enhancing sensitiveness to green light. While not a single red substance could be found that possessed that property no fewer than eight colourless substances exhibited it.

The following substances neither increased nor diminished the sensitiveness:—

Ammonium hippurate.	Phloridzin.
" mucate.	Parabanic acid.
" malate.	Tincture of aloes.
Plumbic arsenite.	Potassic formate.

It was a little uncertain whether two of these substances—phloridzin and potassic formate—did not give a slight increase of sensitiveness.

The following colourless substances distinctly diminished the sensitiveness to green light:—

Brucia.	Gentianine.
Strychnia.	Podophylline.
Narcotine.	Aconitine.
Daturine (tincture of stramonium).	Asparagine.
Acid ammonium urate.	Berberine.
Piperine.	

Finding, therefore, no red substance capable as such of increasing the sensitiveness of AgBr to green light, and, on the other hand, many colourless substances which have that effect, I am entirely confirmed in the opinion originally expressed in the pages of this journal—that there exists no relation between the colour of a substance and that of the rays to which it increases the sensitiveness of silver bromide. M. Carey Lea.

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CARBON PRINTING IN HOT WEATHER.

As printing in permanent pigments presents some difficulties in the summer time, would you allow me to give a few hints which may be useful during the hot weather? The special trouble is a reticulation or breaking up of the film, consequent upon the high temperature of the water with which the operations are conducted.

Hints.

1. Make the sensitising bath as follows:—

Commercial bichromate of potash............	1 ounce.
Liquor ammonia fortis	5 minims.
Water	35 ounces.

2. Keep the sensitising bath cool by placing rough ice round the tray containing it.

3. Sensitise the tissue over-night, and let it hang in a room from which all white light has been excluded until the next morning; it is better for drying slowly.

4. The water in which the tissue is immersed previous to its being laid down upon the collodionised plate or temporary support should be kept cool by having ice in it. The temperature should not exceed 55° Fahr.

5. After placing the transfer-paper upon the plates leave them to dry in a cool place. Water the floor, if necessary, to prevent too rapid drying.

6. Do not allow the collodion used for coating the plate to become too thick; dilute with equal parts of ether and alcohol.

J. R. Sawyer.

ON SOME NEW FACTS IN SUPPORT OF DR. VOGEL'S COLOUR THEORY.

[A communication to the Photographic Society of Great Britain.]

While recently continuing my experiments with reference to the photographic effect of the solar spectrum upon stained dry collodio-bromide films I have obtained some results which go far to prove the correctness of Dr. Vogel's theory, and may, therefore, be of interest to the members of the Photographic Society.

When I first commenced my experiments I found that Dr. Vogel's theory did not hold good for the blue dyes—at any rate for the only available specimens of the aniline blues I could obtain here—the results obtained with such dyes being almost identical with those given by yellow or orange dyes; and, although plates stained with them proved sensitive for the whole spectrum up to A, they showed no marked *increase* of sensitiveness whatever for the yellow and orange rays which they absorb. The only exception was with a dye called "green," but which is really a blue or violet.

Dr. Vogel has favoured me with a sample of a blue dye which shows a most marked sensitiveness for the orange rays. This dye, cyanine blue*, when dissolved in alcohol gives a spectrum showing a very strong absorption for the yellow and orange rays above and below D, being stronger for the orange below D than for the yellow above it, the strength and extent of the absorption varying, as usual, with the strength of the solution, both towards C and E. On the photographic plate we find a most intense action in exactly the same part of the spectrum, the strongest effect being below D towards C, which also corresponds precisely with the character of the absorption band. Below C there is no action, nor is there any action in the green; and in the blue and violet regions from H nearly to F the action is very faint indeed. On one of my plates, possibly stained rather strongly with the dye, there has been no action at all on any other part of the spectrum but the orange and yellow. The fact that in this case photographic action is confined exclusively to the part of the spectrum absorbed by the dye shows, I think very conclusively, that the absorptive power of the dye exerts a very important influence on the photographic action.

Dr. Vogel also has noticed that the aniline-blue dyes form an exception to this rule, and attributes it to the fact that the dyes in question do not act powerfully enough as reducing agents, or do not combine easily enough with iodine or bromine. Having, the other day, to refer to Beale's *How to Work with the Microscope*, I found in the appendix a statement to the effect that Mr. Sorby had observed that a certain organic blue substance obtained from an aquatic plant found on stones in stagnant pools was the only blue liquid that gave him definite absorption bands. It struck me that it was not impossible that the failure of the aniline-blue dyes to show increased sensitiveness to the yellow and orange rays might be partly attributable to the fact that, although these dyes strongly absorb the regions of the spectrum about the yellow and orange, they do not show a clearly-marked absorption band in weak solutions. I am the more inclined to think so because I have found that in other respects the blue dyes behave very well as sensitisers—that is, they yield images of a very good character as regards intensity and brilliancy. On the other hand, cyanine blue shows a strong and well-marked absorption band, but does not act well as a sensitiser, being apt to produce fog. I have also noticed that the peculiar bands of increased photographic action observable on plates stained with dyes of different colours are almost invariably most distinctly marked on the plates treated with dyes showing strong absorption bands, and that other dyes, though apparently well suited to act as sensitisers for a dry bromide film, do not produce the desired effect unless they show a strongly-marked absorption of the spectrum. Fluorescent dyes also seem particularly suitable for exhibiting these effects; and the absence of well-marked fluorescence in blue fluids may also have a bearing on the unsuitability of most of the blue dyes to produce the increased intensity of action in the yellow and orange.

In the absence of proof of the actual cause of this unsuitability of the blue dyes, this explanation appears not improbable for the reasons I have given; but it is, however, only a conjecture, and further investigations will be necessary before it can be accepted. I should not put it forward now had I the means of making further inquiry into the facts; but the difficulty of ascertaining what substances would be most suitable for experiment and of obtaining them here, as well as the very little leisure at my disposal for carrying out such inquiries, render it impossible for me to expect to obtain more definite results, at any rate for the present.

Another point on which I thought that Dr. Vogel's theory seemed scarcely borne out by results was that plates stained with dyes showing two or more absorption bands, such as eosine and naphthaline red, did not show a corresponding rise of sensitiveness or intensity in more places than one. I have, however, quite recently obtained photographs of the spectrum on dry bromide plates stained with a watery solution of carmine, showing two very distinct bands of increased action in positions corresponding very closely indeed with the absorption bands of the dye.

* From Watts's Dictionary, i., p. 873, and 1st Supp., p. 430. Cyanine or chinoline blue is a resinous substance formed by the action of potash on amylchinoline iodide, and has the formula $C_{28}\ H_{35}\ IN_2$.

A weak solution of carmine in water containing a little ammonia shows two well-marked absorption bands—one very strong, between and about C and E; the other not so strong, between E and D, at a point at the end of the green just above D. There appears to be also a third weak band about F. The photograph shows two well-marked bands of increased action, one immediately above E and the other just about D; both bands are, therefore, slightly lower in the photograph than they appear in the spectroscope. The most intense action is in the blue and violet region, extending from H nearly to F, then there is an abrupt decrease of intensity, and the photographic action continues very gradually decreasing to about B, with the exception of the two bands of increased action before noticed.

This result, with that obtained with the cyanine blue, shows that, although the chemical constitution of the dyes may influence the results, there is no doubt that the peculiar increase of sensitiveness shown by the stained bromide of silver is intimately connected with the optical properties of the dye used, as exhibited by its absorption spectrum, and thus fully bears out the theory proposed by Dr. Vogel, if it do not absolutely prove it.

In the very interesting and suggestive paper read by Captain Abney at the March meeting of the Photographic Society that gentleman expresses the opinion that the dyes combine with the silver and silver bromide left in the films to form compounds of a resinous nature, that these organic silver salts are sensitive to the red or other rays, as the case may be, and that the effect of the addition of the dyes to the film is to cause sensitiveness in the film, owing probably to their chemical composition rather than to their colour.

Now, although I agree that the mere *colour* of the dye has little influence in increasing the photographic action of the less refrangible rays upon a film of bromide of silver (because a film may be stained green without showing any increased sensitiveness of the plate for the red rays, and *vice versâ*, or blue without increasing the sensitiveness for the yellow and orange rays), the results I have mentioned above and others show, I think, very conclusively, that the increase of sensitiveness is not dependent only on the chemical constitution of the dyes. Most of the stained plates seem more or less sensitive to the more refrangible rays of the spectrum. As regards the less refrangible I have met with very few, if any, cases of what may be called abnormal action, if Dr. Vogel's theory be assumed as correct; and, as far as my experience goes, I have never found a dye giving greater sensitiveness for the less refrangible rays principally transmitted by it than for those absorbed by it. Captain Abney does not appear to have considered the photographic effects of the dyes with reference to their absorption spectra, which is really the point at issue as far as Dr. Vogel's theory and results are concerned, and is only indirectly connected with the question of extending photographic action into or beyond the visible red.

Dr. Vogel and Mr. M. Carey Lea have both found that this extension of action can be obtained by treating the bromide film with colourless organic substances, such as tannin, salicine, and other dry-plate resensitisers; and, although I have not paid much attention as yet to this part of the question, my results agree with theirs. Dry bromide plates, plain and treated with tannin and salicine, have all shown a prolonged direct action in the region of the red and ultra-red; but the action is faint, and I have not succeeded in obtaining distinct lines. Plates stained yellow or orange with annatto have given me good intensity with lines (direct) as far as A, and one line below, at about the same distance as *a*, with a faint continuation, the limits of which are difficult to follow. The tannin and salicine plates also show faint traces of action prolonged, I should say, to the extent reached by Captain Abney; but I have not worked with these sufficiently to speak positively. Captain Abney's method of obtaining not only the very great extension of action in the ultra-red, but also the intensity sufficient to render the lines distinct, is undoubtedly a very important advance, and one which will be of great value in spectroscopic observation; but Captain Abney will, perhaps, pardon me for thinking that the results he has obtained are not altogether sufficient foundation for his belief that the sensitiveness caused by the addition of the dyes is due principally to their chemical constitution. Further evidence is, I think, also required to show that *resinous* substances are produced under the influence of light upon bromide of silver as it exists in a well-washed plate, by the action of the many colouring matters, both aniline compounds and others, which have been successfully experimented upon both by Dr. Vogel and myself; and it would be particularly interesting to know if these resinous compounds are formed in the case of the dyes which show the bands of increased intensity and not in the others.

J. Waterhouse, *Capt.*, B.S.C.,
Assistant Surveyor-General of India.

SOMETHING MORE ABOUT MEDALS.

The question of the advantages and disadvantages of giving medals or awards at photographic exhibitions is one that has been frequently discussed in these pages; but at this particular season, when the various societies are having under consideration the best means of promoting the success of the displays which are intended to be held, and especially as I am aware that there exists in most of them considerable diversity of opinion on the subject, I think a brief reconsideration of the subject, and an unbiassed statement of such opinions as have reached me, may not be unprofitable.

The question of awards is so intimately connected with the aims and objects of photographic exhibitions that it cannot be properly considered unless they are kept clearly in view. For my purpose they may be said to be mainly three:—Firstly, they educate the public taste, by serving to bring together the best work of the best men throughout the country, and so giving an opportunity of seeing collectively, and studying comparatively, what but for them could only have been seen in at most twos and threes as specimens. Secondly, they tend in a high degree to elevate the art itself, as they afford opportunities to photographers for studying the works of others side by side with their own, give rise to a laudable emulation to strive to equal the best, and serve also to show what to avoid in the struggle to reach the highest attainable point of perfection. Thirdly, they give a very decided impetus to trade, both in general and what may be called "special" cases. The impetus to trade in general arises from the greater degree of popularity to which, for a time at least, the art attains; and the increase in special cases arises in consequence of those whose work may with one consent be acknowledged to stand high above their rivals, or whose particular style may attract attention and win admiration, all of which are, of course, followed by increased employment.

Such being the case, it follows, as a matter of course, that whatever in any degree tends to promote the success of photographic exhibitions is worthy not only of consideration, but of hearty adoption by those to whom they are of special interest; and those who look with favour on the presentation of medals or awards hold that they bring forward a much larger number and a higher class of exhibitors, as the chance of a medal, which would not only be in itself an honour, but which would undoubtedly by a judicious publicity materially increase professional reputation, would be a sufficient inducement to them to incur the necessary expense. That there is much truth in this is readily admitted by those opposed to the awarding of medals; but they take their stand on the acknowledged difficulty—"absurdity" some call it—in the attempt to measure fine art. They acknowledge that in the early days of photography, when the technicalities of the profession were everything and the art phase at a somewhat low ebb, the giving of medals might have been useful, and these prizes were comparatively easily awarded; but that now, when technical excellence is the rule, pre-eminence depends mainly on high art, and that being purely a matter of taste, the award given by any jury proves no more than that, in their opinion, the picture for which it is given is the best, while it is almost certain that another jury of equally eminent men would make a different selection.

Again: it is urged that even when the medal is really awarded for the best picture it may not be given to the right man. Formerly, when pure photography only was practised, a portrait was really what it professed to be—the work of the photographer; but now that retouching is so extensively practised, and is by those who really are true artists so skilfully done, they say there is nothing to prevent an unprincipled man from sending a few of his negatives to an able professional retoucher, and by such means probably secure a medal by pictures which, without the after-manipulation, would have been nowhere in the competition.

Many other objections have been urged, but probably the most formidable, and that of most frequent occurrence, is the tendency to produce wrangling and discord amongst those more immediately connected with the exhibition—a difficulty which the Edinburgh Photographic Society have endeavoured to overcome by the somewhat novel device of debarring themselves and all exhibitors resident in Edinburgh, which, I suppose, means pretty much the same thing—from competition.

There is another argument in favour of medal awards, and one that I have not seen noticed before. I have said that one of the objects of an exhibition is to educate the public taste. It will be readily admitted that a considerable number of visitors to such exhibitions have really a difficulty in selecting for themselves those pictures that are most worthy of admiration. Now, although the works to which the judges have attached "first prize" and "second prize" may not really be the best and second best of their class, yet they will, undoubtedly, possess sufficient merit to serve as standards of comparison and guides to those whose art-training has not been such as to enable them to make the selection for themselves.

On the whole, the medal question is beset with many difficulties, although at the same time it possesses many advantages, and, without attempting to strike a balance between the two, I should say that, where a fair promise of success without their introduction appears, much unpleasantness would be avoided by abstaining from the practice; but, at the same time, whenever it is likely that their introduction might materially promote success, I am certain that by a little forbearance on both sides much of the difficulty would disappear. J. Nicol, Ph.D.

DR. VOGEL'S COLOUR THEORY.

I have just read in the *Photographic Journal* a paper by Captain Waterhouse, in which he notices a communication I made to the Photographic Society in March last. Allow me, through your columns, to thank him for the courteous way in which he combats some opinions I have expressed. When a controversy is so good-naturedly entered into it is always a pleasure to advance an argument.

Let me premise that I am quite open to be convinced as to the truth of the colour theory, and I expressly stated that I have obtained the same indication in stained plates as Captain Waterhouse and Dr. Vogel. So far from not having paid attention, however, to the absorption of the dyes, I have photographed a good many of them. Now, in order to be able to impress a plate with an absorption spectrum in (say) the yellow, it is quite manifest that a plate must be obtained which shall be sensitive to the red as well as to the blue, without showing sudden partiality for one portion more than another. Such plates I work with, and very pleasant they are to deal with, except in the development, which must be felt for more than seen.

I have experimented largely with eosine—the same dye with which Captain Waterhouse has obtained such successful results. One suggestive experiment was as follows:—An emulsion of eosine with excess of silver. It was endeavoured to form in the ordinary manner, a calculation having been made, which subsequently was corrected by experiment, as to the amount of silver necessary. The addition of silver nitrate to the eosine showed that a combination had taken place; for fluorescence was annihilated, and a crimson colour resulted. An emulsion at first formed, but finally nearly totally dissolved in the solvents of the collodion; but after coating a plate with it and drying it no crystallisation was apparent, and on exposing it a feeble image was obtained. The method of washing the emulsion evidently could not be carried out, so to a neutral washed emulsion, emulsified originally with an excess of silver, a quarter-part of the "collodio-eoside" was added. A plate coated with this mixture gave a crimson colour, and on exposing it to the solar spectrum an image of the least refrangible rays was obtained on development, extending from the blue to a line below A (the violet part was not thrown on the plate). An exposure of twenty minutes with a slit ·0015 was sufficient to obtain this result. To the same washed emulsion (collodio-bromide) a small quantity of eosine was added, just sufficient to give the film a pale pink tint, and a more prolonged exposure was given to the same spectrum. Similar results were obtained as those described in Captain Waterhouse's communication to the Asiatic Society.

Now Dr. Vogel has expressly stated that a great depth of colour was to be avoided. And yet in the first case, the deeply-coloured film gave an image prolonged far beyond that on the faintly-coloured one. Is not the probable explanation that in the one case a silver compound was formed capable of being acted upon by the least refrangible rays, whilst in the second case the quantity of sensitive salt caused by the combination of the minute quantity of silver left in the film was so small as to be almost inoperative to them? Any increase of depth of colour, when the necessary silver was absent, would be absolutely hurtful for those rays which the dye absorbed. If this be so the colour film is not everything. In Dr. Vogel's last communication to the *Photographic News* of this month he states that he has found it necessary that the silver bromide should be prepared in an *excess of silver*. An emulsion prepared with *excess of bromide* rendered the action of the dyes inoperative. The logical sequence to this is what I contend for with the first eosine emulsion. I have obtained negatives of a landscape through glass, which transmitted nothing but red rays. With a stereo. lens of five-inch focus and two-tenths stop a moderate image was obtained in eighty seconds, whilst through a cobalt glass the same emulsion required an exposure of fifteen seconds, giving a good picture.

In the spectrum experiments I used originally to expose the plate to all the rays which could be admitted into the camera. At the present time I place bichromate of potash or a scarlet dye before the slit of the spectroscope, and thus cut off the blue, or the blue, green, and yellow as the case may be. I believe I obtain better images of the lower end of the spectrum by this method. Perhaps it may be due to the fact that the necessary action is not set up. At any rate, it appears to me that the theory of the prolongation of the spectrum being due to the continuating action of the lower rays is untenable when this method of experimenting is adopted.

I will take another instance of the effect of dyes on the film. These are blue dyes of the aniline series. With these I have experimented, and prepared emulsions with them as I did with the iodine. There was, apparently, no trace of combination of silver with any of them. When the deep blue emulsion was employed not a trace of a spectrum was obtained, whilst with the light lavender-tinted emulsion an ordinary normal image appeared on development.

At present my experiments are devoted to the more colourless organic salts of silver and iron salts; and now that I have a properly worked train of prisms and lenses of rock-salt I hope that solar lines far below what I have already here obtained may be surpassed. Already I have utilised these plates to obtain photographs of the red end of the calcium and iron spectra, and others will subsequently be photographed.

Dr. Vogel has apparently obtained the same results in less time than I have with a simply-washed bromide film. He is evidently working under conditions more favourable than I am, as this is the least time in which I can obtain them with moderate exposure on plates so prepared. His process has evidently improved since his controversy with Dr. Monckhoven (see *Photographic News*, vol. xviii., page 364), in which he states this gentleman, to obtain the same results as himself—which apparently was to get down to "A"—should have exposed a hundred and fifty minutes. Now, as the length of spectrum and width of slit that I am using are about the same as those which Dr. Monckhoven employed, and that in one-twelfth part of that time I can obtain the A line, and that Dr. Vogel can obtain the same result under the same conditions in less time than that, it is apparent that his washed bromide films are more generally sensitive than any I have as yet tried. It is almost discouraging.

The first part of Captain Waterhouse's paper I shall carefully digest. If the colour theory and not the mechanical theory be correct, the logical inference is that a black film will be the most generally sensitive. The blackest dye that I have been able to obtain and applied to the film has given no promise of success, owing, I believe, to its non-combination with silver.

W. de W. Abney, *Capt.*, F.R.S., &c.

ON THE PREPARATION OF SENSITIVE DRY PELLICLE FROM COLLODION AND FROM GELATINE.

[A communication to the Photographic Society of Great Britain.]

I propose to lay before the Photographic Society tonight the results of my work in a more or less new direction. During the past winter and spring I have been engaged in investigating the best method of making a sensitive pellicle, both from collodion and gelatine; and I have further been working in the direction of making sensitive pellicular films ready for exposure in the camera, and thus doing away with the necessity of a glass or paper support. I will make my communication as brief as I can consistently with a clear explanation of what I wish to bring before you, and will begin by describing my method of preparing a collodion pellicle ready for exposure.

Finding a certain amount of difficulty in preparing a pellicle from what we may call an ordinary washed emulsion, I have been working of late in the following manner:—I take a good sample of plain collodion and add to it sixteen grains per ounce of bromide of cadmium dissolved in as little alcohol as will do it, and then pour out the bromised collodion into a clean glass dish for the solvents to evaporate. I make a silver bath of 120 grains of nitrate of silver and ten grains of nitrate of uranium to the ounce of water, with one minim per ounce of nitric acid. I then cut up into small pieces, about an inch square, the collodion from which the solvents have evaporated, and, placing it in a bottle, I pour in sufficient of the silver bath to cover the pieces of pellicle. The silver bath will sensitise them throughout their bulk in from twenty minutes to half-an-hour, depending upon the thickness of the evaporated collodion; and I take this opportunity of mentioning that the thickness which I find the best is about an eighth of an inch.

It may be said that the use of a 120-grain bath is extravagant. It is quite the reverse. Four ounces will sensitise enough pellicle for two dozen 12 × 10 plates; and as no dirt goes in from the back of the plates, and no albumen or other deleterious substance, the four ounces will only want strengthening before being used again.

I show pieces of the unsensitised collodion; and in this bottle you will see pieces of the sensitised material immediately after sensitising, while in the third bottle is the pellicle after being dried.

When the collodion is thoroughly sensitised the whole is turned out of the bottle into one of the little porcelain capsules, of which I bring one to show you, and the silver bath allowed to drain thoroughly from the pellicle. It is then restored to its bottle by a glass or porcelain spatula, and two or three rapid rinses are given to it with distilled water (pouring it each time through one of these capsules to let the water drain away); sufficient of a thirty-grain solution of bromide of potassium in water is then put into the bottle, and the pellicle allowed to soak in it for ten minutes or so; another rapid rinse or two is given to get rid of the bromide, and the pellicle, after having been pressed between blotting-paper to get rid of the surplus water, is dried by a very gentle heat, and, when dry, is ready for use. There are some samples of collodion which appear to require organifying; and any of the organifiers in general use can be used. I have obtained good results from my own salicine preservative, from gum gallic, from tannin, and other organifying materials; and the only precaution necessary to be observed is that the organifier must, if used, be rinsed away previous to the drying of the pellicle. The advantages that I find from the use of this process are great rapidity and certainty of working; we dispense with the manufacture of an emulsion, and, in lieu of that, have merely to pour out the collodion to set over night, the whole of the operation of sensitising and washing a very large quantity of pellicle taking less than one hour.

This brings me to a point which I am anxious to impress somewhat strongly upon you. A considerable amount of research into the matter has convinced me that in the process of forming bromide of silver an organic substance is formed by the contact of nitrate of silver and pyroxyline or gelatine, and that this organic substance is *very soluble in water;* consequently, it is an object to use the water as rapidly as possible in the washing operations, so as not to soak this organic matter out of the pellicle. To this short washing this process lends itself most advantageously. It is not difficult to trace this organic matter, as, if a pellicle containing neither free bromide nor free silver be soaked in pure distilled water, and the water then exposed to sunlight, a deep brown colour will soon show the presence of the substance to which I have referred. This dried pellicle will keep without change; and when required for use it is only necessary to take as many of the dried tablets as would represent an ounce of the collodion, and, dissolving the tablets in ether and alcohol, we have at once an emulsion perfectly ready for use. This emulsion gives a beautifully-fine film; and I have here a bottle of it to show you its perfection in this respect. I may mention that I also add organic matter, if I find it required, to the collodion itself; and a few drops of a saturated solution of gum arabic in glycerine to each ounce of collodion, added before it is poured out to set, will be found very useful. The preparation of the plates and the development are carried on in the usual way, the latter being, of course, my strong alkaline developer.

I now proceed to the formation of pellicle from gelatine. There has been so very little reliable information given as to the formation of pellicle from gelatine that each one has to take a line for himself —all of us, however, taking the starting point of Mr. Johnson's letter in which he first suggested the formation of a pellicle. This publication fortunately prevents there being any patent rights to bar the way, and the manufacture and use of gelatine pellicle is free from trammels. My method of working is as follows:—In a small German beaker I dissolve forty grains of bromide of ammonium, or the same proportion of any other bromide, and twenty grains of gelatine in twelve drachms of distilled water, and when dissolved I pour it into a bottle; this bottle must now be heated in hot water till the temperature of the contents is about 180°. Seventy grains of silver having been previously dissolved in four drachms of water (and kept hot in another small beaker) is added little by little to the hot gelatine in the bottle. The bromide of silver will be immediately formed; and in order to prevent any excess of silver remaining in the emulsion two grains of bromide of ammonium dissolved in ten minims of distilled water are added after the whole of the silver is in. I also then add twenty to thirty more grains of gelatine, according to the sample of gelatine that is used; and the emulsion being well shaken every two or three minutes is, after standing for a quarter of an hour in the hot water, to be poured out from its bottle into a glass dish, in order that it may become solid. Ten grains to the ounce of nitrate of uranium adds greatly to the keeping qualities of the emulsion.

You will notice that I make a considerable alteration from any instructions that have hitherto been given for the preparation of gelatine emulsion, as I work at an exceedingly high temperature, with the object of forming my emulsion at once, instead of spreading the formation over many hours, as I believe other workers do. I get the most perfect films by this method of working; and I am certain that the above temperature has no injurious effect whatever on the gelatine, while the time that I save and the certainty that the emulsion is perfectly made are great advantages. When the pellicle is "set" in the dish into which it has been poured it is cut up with a clean slip of glass and put into a bottle; it is then rapidly rinsed with three or four changes of distilled water, and then with two changes of methylated alcohol, in the latter of which it is allowed to soak for a quarter of an hour. It may then either be taken and, after blotting off the superfluous moisture, be dried by a gentle heat, or it may be left in a bottle with clean alcohol, which I find to be by far the best method of preserving sensitive gelatine pellicle; and under any circumstances, if it be desirable to make the pellicle into a dry substance, the two washings of alcohol are most important, as they extract all the water from the gelatine and render it far easier to thoroughly dry the pellicle. I also find the diluted alcohol useful in the preparation of the collodion pellicle; but I need hardly point out that in that case it must not be used too strong, or it will cause partial solution.

With regard to the making of plates from this gelatine pellicle I have little to remark, as the gelatine simply requires to be dissolved in warm water, the amount of water being regulated by the thickness of film required. The amount of two ounces specified in my formula makes about four or five ounces when diluted.

With regard to the method of making pellicular films ready for exposure in the camera, I am meeting with most encouraging success in that direction; and I trust that if the subject should be thought of importance to our members, I may find an early opportunity after our *réunion* of bringing the results and formulæ for pellicular films before you. The pellicular sensitive film can be made any thickness; and I here exhibit two strips cut from the edges of two prepared films to show the thicknesses I most commonly use. I had intended to bring you some large prepared films to see tonight; but, unluckily, my laboratory assistant, not knowing of my intention, used them all yesterday in the course of experiments, and I could only bring the edges which happened to have been cut off, a piece being always kept of each large film for reference.

I have brought several negatives taken on pellicle films without any glass being used, and they will show you the quality of film to be produced by the "bath-emulsion" process as above described, and also from gelatine. They do not profess to be mechanically perfect, as they are merely to be taken as the result of my experiments, and are not prepared with that amount of care to avoid dust, &c., &c., that would be taken if one wanted perfect negatives. I may here mention that I have used the dish without bottom recommended by Mr. Warnerke to develope my films, and thus obtain great ease of manipulation.

I will now show two pieces of apparatus which I find to be of great use in obtaining reliable comparative results in the exposure and development of various kinds of dry plates. I test all dry plates by means of this actinometer which I have here (as well as a test-plate from it), the plate being placed in contact with it always at a stated distance from a standard gas-burner, and developed with a standard developer. Test-work with this actinometer is very reliable, not only for rapidity, but also for density and other qualities of a negative. It has shown me conclusively that collodion films can be made quite as sensitive to dull light as gelatine is; indeed, more so, as they are far more manageable under the developer. In order to do away with any difference from the evaporation of ammonia during the application of the alkaline developer, I have had this other piece of apparatus constructed. You will notice that I open it completely and lay the plate in it; I then close it, the india-rubber all round making it water-tight. With a funnel I then fill the well at one end, and when I tip it up the solution runs over and remains on the surface of the plate. For use in the open air I put two little windows of yellow glass on the white ones; and, as there is a drainage-hole at the opposite end of the well, I can develope, fix, and wash my plate in the open air.

I will close by saying that what I have now laid before you is the result of long and patient work. I am not one of those who rush hastily into print with crude and imperfect formulæ, but I work my test over and over again before I venture to give formulæ to the public. I claim, therefore, from those who try these processes intelligent and fair criticism. I do not profess to write for the small ring who see nothing good in any thing not devised or suggested by themselves, but for those who, with an honest desire for progress, will always be willing to give attentive consideration to the researches of others.

H. Stuart Wortley, *Lieut.-Col.*

FOREIGN NOTES AND NEWS.

M. Denier's Remedy for the Cockling of Mounts.—Dr. Vogel at Philadelphia.—Mr. Ryder's Hooded Camera.—The Trade Mark Registration Act and the Austrian Chamber of Commerce.—What is really meant by Hommel's Plastophotographic Process.

The *Photographische Correspondenz* gives an illustration of M. Denier's contrivance for preventing newly-mounted photographs from cockling. He takes a piece of wood the same width as the mount, but rather shorter, and to each end of the wood he nails laths, the undersides of which are grooved. When the photograph is mounted the card is bent outwards until the ends fit into the wooden frame, the picture being uppermost, and is left to dry in this position all night. On being hot-pressed next morning the mount becomes perfectly flat. M. Denier has used this frame for a long time; but it seems more suited to a small business than to a large one, as the frames would require a good deal of room to store. Would not the same result be obtained by passing a damp sponge across the back of the mount?

Dr. Vogel is at present in Philadelphia, where he has gone to act as one of the judges of the photographic department.

A hooded camera shutter has been patented in the United States, which professes to afford the same shade and protection to the photographic lens as the eyelid does to the human eye. The inventor, Mr. J. F. Ryder, says:—"All photographers know that the camera is like the eye in seeing things photographically. All know that the eye sees better when protected from strong light; many know that too much light enters the eye of the camera and prevents it seeing and impressing the image clearly. Particularly is this the case in making shadow effects where the camera is more or less pointed towards the light." The new invention provides against this, as it consists of a novel movable awning, fixed to the upper front end of the lens tube by means of a metal framework, which covers the lens when closed. The frame is moved by a spring hinge, and the least touch of the hand immediately closes or opens the camera. Internally the hood is lined with black velvet.

The Chamber of Commerce and Industry for the Austrian Empire calls the attention of manufacturers dealing largely with Great Britain to the trade-mark registration act of the 13th August, 1875, which comes into operation on the 1st July of the present year, and advises those interested to become members of the Trade Mark Protection Society in London.

There has been a good deal of squabbling lately as to whether a process called Hommel's "plastophotography" is really a new process or only a revival of M. Denier's process, the latest contributions to the subject being an article in the *Photographische Correspondenz* and an extract from a communication from Herr Hommel to the Photographic Society of Frankfurt-am-Maine. In the latter we are told that Herr Hommel's process is intended to produce soft pictures, and thus almost do away with the necessity for retouching. He coats both sides of the plate with collodion and sensitises them, so that in the camera he obtains two negatives—the usual or principal and a supplementary negative showing only the high lights. An upright bath, into which the glass is dipped by means of a frame holding its four corners, is used for collodionising, sensitising, fixing, and developing, the bath in the latter case being of glass so that the operator may see what he is doing. The plate is fastened in the dark slide by means of two springs attached to the lid and crossed so as to hold the plate by the corners only. Herr Hommel has made arrangements with various firms for the supply of suitable utensils.

In a further communication from Herr Hommel, laid before the Vienna Photographic Society on the 9th May, he says that they must be mistaken in saying that his process is not new, for as a perfectly new process he got a Prussian patent for it on the 4th October, 1875.

This serves as a text for the *Correspondenz* to launch out against the administration of the patent laws in Germany, placing them in unfavourable contrast with those of England and America. It inquires to what man at the head of the profession the officials of the patent office in Berlin applied for information on the subject of the novelty of the invention before granting the patent, since no member of the Berlin Photographic Society—not even the President, Dr. Vogel—had heard of it before the 7th of April, 1876. In contrast to this laxity on the part of the German officials the *Correspondenz* mentions that the patent is recorded in *The Commissioners of Patents' Journal* (London) of the 30th November, 1875, as being one of six patents granted in Prussia on the 4th October, and that it gave protection for three years.

THE CENTENNIAL EXHIBITION AT PHILADELPHIA.

The jurors completed their inspection of the photographic department of this exhibition on the 16th inst., but up to the time of our going to press we have not been made aware of the nature of their awards.

A correspondent, who has sent us his "first impressions" of the exhibition, says that "if American photographers *do* blow a little occasionally, they are amply justified in doing so," from which we infer that the artistic work of American photographers appears to our correspondent to be of a higher character than he had been led to anticipate. Amongst the finest productions in the exhibition he classes those of Gutekunst of Philadelphia, Lander of Cincinatti, and Luckhardt of Vienna.

The *New York Tribune*, in an offhand notice of a few of the works of American photographers, reports as follows:—

Among the Philadelphians the portraits of the handsome and distinguished surgeon, Prof. Gross, by Wenderoth, of Hawley and Goshorn by Wm. Curtis Taylor, the large landscape views along the Pennsylvania Railroad by Gutekunst, the enlarged photographs finished in india ink and crayon by Broadbent and Phillips, the extremely fine pictures of animals, noticeably the famous race-horses, by Schreiber and Son of Philadelphia, are specially attractive to the visitors to this building. The Montreal collection of full-length pictures, in oil and crayon, will cause a lingering visit to Notman's alcove. A group of dogs from life studies alone would make it distinctive.

Kent of Rochester exhibits the perfection to which work may be reached in photographs of immense size, fifty-inch plates being common in the display. Rocher of Chicago, in his ladies' groups, gives examples of an artistic finish that judges say cannot be excelled by anything abroad. The enormous-signatured Sarony of New York here exhibits in all his perfection the wonderful skill in lighting, in posing, and in making effects, whether in charcoal drawings or in small photographs, for which he is so justly noted. Joseph T. Brady of Washington presents his familiar faces amongst the past and present notable people of Washington.

The South comes up from Richmond and Baltimore with the belles of the two cities as pictured by the cameras of Anderson of Richmond in plain photography, and of W. A. Cox of Baltimore in the shape of porcelain miniatures. The vitrified enamels of Marshall of Boston, near by, show the efforts at making enduring likenesses. The character portraits of Ryder of Cleveland, Ohio, in crayon, give to the life indeed the newsboy, the jockey, and the saucy darkies of the South. This artist has already made his reputation in this line, as the publisher of Pluck Nos. 1 and 2. Ohio also sends some fine samples of landscape and architectural work through Sweeney of Cleveland. Stillfried and Anderson, an American firm in Yokohama, Japan, hang up a few curious portraits of Japanese women—curious only, however, because of the subject, not of the workmanship. The splendid climate of San Francisco enables Bradley and Ruloffson to present some marvels from life in crayon and pastel. A child with a doll is speaking in its naturalness. The babies of Hesler of Evanston, Illinois, must almost be kissed to discover that they are not living. Howell of New York will have a large exhibit. The photographic enlargements by solar light in the eastern part of the building, close by, by Paxon and Brother of New York, will draw the attention of the more superficial observer, because of their enormous size and high position. The eye of the scene-painter's critic is necessary to be able to judge of their full effect.

Passing into the apparatus and accessory departments, the photographic publications of Benerman and Wilson, or rather of Edward L. Wilson, editor of the *Philadelphia Photographer*, are noticeable. They are the only firm in the country exhibiting that make a specialty of these publications. The transparencies on glass for door and window ornamentation by the Woodbury process of printing, as exhibited by Mr. Carbutt, the Superintendent, show a new application of photography which promises to be a most interesting one. A. M. Collins, Son and Company, of Philadelphia, equal, if they do not excel, any foreign firm in their manufacture of photographic cardboard and designs for framing pictures. L. M. Seavey, of New York, the scenic painter, makes an interesting exhibit of photographic accessories, backgrounds for set pieces. Among the apparatus proper is conspicuous the collection of the Scovill Manufacturing Company of New York, the finish in French walnut of their work being striking, and Woodward's solar camera catches the technical eye. Altogether the photographic display will compare favourably with any other department in the Art Gallery.

THE SCENERY OF THE BLUE MOUNTAINS, N.S.W.

Even those of your readers to whom New South Wales is little more than a name have heard of the Blue Mountains—the barrier which so long obstructed the progress of settlement towards the west. From the higher parts of Sydney they are visible, about thirty miles westward, as an unbroken wall with level outline, except where a cluster of rounded peaks lift their heads. On a nearer approach the wall appears seamed with numerous ravines and gorges, impassable, as the sides are lofty, over-hanging cliffs, the hollows filled with dense, tangled jungle, or "brush," as it is called, and the heights covered with forest and thick undergrowth or "scrub."

The Blue Mountains is a tract of sandstone formation some forty miles in width, which seems as if it had been elevated in times past with a tolerably even surface, but with a general inclination towards the east, the eastern edge being about 700 or 800 feet above sea level, and the western about 4000 feet. Some of the mountains rising above the general level consist of igneous rocks thrust through or over-lying the sandstone formation, and on these the brush vegetation is most luxuriant.

This plateau, since its elevation, has been intersected with numerous gorges, cut down perpendicularly to an immense depth by the action of the water, perhaps aided by volcanic convulsions. Through these gorges several rivers and streams flow, uniting to form the Hawkesbury River, the scenery of which Mr. Anthony Trollope praises so highly, comparing it favourably with that of the Rhine.

This tract of country long baffled the attempts of explorers to pass it; but at last a practicable route was found by following the windings of a ridge dividing the waters falling into two parallel gorges. A good road was formed by means of convict labour, some parts of which display much engineering skill, particularly the descent of Mount Victoria. This road, with another track for cattle and sheep, was long the highway to the fertile plains of the west.

But as settlement went on these districts became so important that it became necessary to connect them with the capital by means of a railway; and after much exploring it was determined to take the line along the same crest which the old road follows. This was an engineering work of which we are justly proud, as the line runs for about a hundred miles through utterly barren and unproductive country, having cost, on an average, £14,000 per mile, and some parts nearly double that rate, where the mountains are ascended and descended by zigzags, and the cuttings are all through solid rock.

But, though this region is unproductive of the necessaries of life, it is wonderfully rich in scenery, and every distinguished visitor is taken to behold its beauties, especially some of the waterfalls and the Lithgow Valley zigzag. I cannot attempt a general description of this scenery, but I intend to note down what I saw during a recent trip to the Valley of the Grose.

Among the lines surveyed for the railway sixteen or seventeen years ago was one along the valley of the Grose—one of the gorges already mentioned, running from the Hawkesbury River into the mountains about fifty miles, and terminated by a narrow ridge, called the Darling Causeway, which cuts it off from the valley on the opposite side, and through which it was proposed to tunnel. This gorge is, I should say, on an average about a mile wide and 2,000 feet deep; the perpendicular cliffs varying from 500 to 1,000 feet in height, the remainder being a steep slope from them to the bottom, where the stream has just room to run, and so densely wooded that it is with the utmost difficulty one can penetrate it.

The railway surveyors, at great expense, formed a track along the bottom; but the idea of taking the railway there had to be abandoned—chiefly on account of the danger of landslips from the steep spurs—and the track became overgrown and, in some places, washed away by floods. The place has been very rarely visited since, the gorge being acessible at two places only, namely, the mouth and its descent from the Darling Causeway at its head. But, lately, the energetic Secretary of the Academy of Art has carried out a long-cherished idea of unlocking the grand scenery of this gorge to the pencil and the camera, and at considerable expense—partly his own—had the old surveyors' track re-cleared for a distance of fifteen miles from the Darling Causeway, so as to allow supplies to be conveyed by pack-horses, formed two encampments, cut down trees to open out the best views, engaged a photographer, and invited whosoever would to take advantage of the unwonted opportunity.

My professional engagements prevented me from making the excursion until the beginning of October, when it was getting rather too hot, and the camp was about to be closed. Our party consisted of six, amongst them artists, professional and amateur, and a successful and enthusiastic landscape photographer named Lindt, from one of our provincial towns, who, like myself, was going to spy out the land with a view to future operations.

We started from Sydney at nine o'clock on a fine morning. For the first fifteen miles the railway runs through a succession of villages rapidly becoming suburbs of Sydney. For the next twenty miles, from Parramatta to Penrith, the country is chiefly forest, enlivened by occasional farms and orangeries. Penrith is at the foot of the mountains, and from here we have a view of the first zigzag. We cross the Nepeau by a magnificent iron bridge on massive stone piers, at a height of only eighty feet above sea level, and then rapidly ascend to a height of 700 feet. As we go backwards and forwards between the reversing stations we have a fine view of the low country with its villages and farms and the river at our feet; but we soon lose sight of this as we wind along the range and look down ravines now on one side and now on the other, and sometimes from the top of a "knife-edge" on both sides. We cross the old road some twenty or thirty times, so closely do we follow the old route. It was the time of flowers, and the woods were gay with a great

variety—conspicuous amongst them the grand waratah, like a ball of flame, blazed through the green foliage; while a lovely purple iris seemed to think that the railway had been cleared for its especial benefit, and made quite a garden on each side of the line.

About sixty miles from Sydney is the platform where visitors leave for the Regent or Weatherboard Falls, as they are commonly called; if not the finest of the mountain waterfalls, they have, at anyrate, the largest body of water. At seventy-three miles we reach Blackheath, the highest point of the line, 3,494 feet above sea level, and from here "Govett's Leap" is visited, two miles from the railway. This is the most convenient as well as the finest, and, therefore, the most frequently visited, waterfall. The grandeur of the view is such as almost to take away one's breath at first sight, so vast is the chasm into which the stream leaps from the precipice. The clear fall is 520 feet, then in broken leaps for another 100 feet, when it is lost to sight in the dark-green brush below; but within half-a-mile it must have descended 1,500 feet below the top of the cliffs. A little to the left is another fall of about the same volume and leap, called the "Horseshoe," or, more recently, "Piguenit's" Fall. There are also four or five other falls leaping into the gorge, but not visible from this point. The gorge itself is filled with the exquisite blue atmosphere which gives the name to the mountains.

The foot of these falls was our destination, but to get there, though only two miles from the top, we had nearly thirty to traverse. First, four miles, part of the way along the edge of a precipice overlooking Canimbla Valley to Mount Victoria, which is a favourite summer resort and the centre of the finest scenery; here we stopped for lunch. Then three miles to the Hartley Vale platform, where our railway journey ended, eighty miles from Sydney and 3320 feet above sea level. This station is on the Darling Causeway, and we look down on the left into Hartley Vale, whence the kerosene shale, from which oil is distilled, is hauled up from the mines to the railway. On the right we look into the depths of the Grose, winding along for miles between vast perpendicular walks. It was half-past two when we left the train, so we quickly shouldered our packs and began a steep but easy descent, for the track was well beaten by the pack-horses. We had to walk about ten miles, following the windings of the stream, crossing the deep gullies of its tributaries, climbing spars, and skirting along steep slopes, but gradually descending, till we were 1,700 feet below the railway. We passed but few spots for the camera, for the brushwood is very dense and the overhanging cliffs are mostly veiled by lofty timber. The sun was very hot, to the great comfort of the snakes, which love to bask in the open path; but hardly to ours, and we were glad to rest occasionally. We reached the camp about sunset, and at once washed away weariness and stiffness in the icy-cold basin of a miniature cascade. Here we found a couple of amateur artists and the photographer, Mr. Bischoff, and we spent the evening pleasantly discussing matters of art and examining sketches. At this camp a large number of trees have been felled, opening to view some grand crags with broken and picturesque skyline, but, unfortunately, supplying a very inartistic foreground.

E. B. Docker, M.A.

(To be concluded in our next.)

ANTIMONY PHOTOGRAPHS.

Mr. John Spiller, in a communication to the *Journal of the Photographic Society*, says:—"Since communicating my *Note on the Production of Antimony Photographs* at the April meeting of the Society I have been in further correspondence with Mr. Francis Jones, of the Manchester Grammar School, and that gentleman has been kind enough to give fuller particulars of his mode of working, some of which may prove interesting to your readers.

"In the first place, I have to correct a misapprehension relative to the degree of sensitiveness of the process, which is far greater than I had represented; for Mr. Jones now tells me that he has 'obtained photographs as dark as any of those exhibited by an exposure of from thirty to sixty seconds,' the depth of colouration depending, of course, upon the strength (or purity) of the gas and the brightness of the sunlight at the experiment. Upon this assumption it might even be possible to utilise the reaction as a camera process; but as yet we have made no experiments upon this point.

"The inventor prefers to regard his process as a mode of obtaining *red* photographs for special purposes, and does not attach any importance to the possibility of toning them by the subsequent application of metallic solutions. In answer to my direct inquiry Mr. Jones states that photographs have been taken from glass negatives; but the details do not come out so clearly as by the silver process. Moreover, the sulphur on the paper attacks the silver of the film after one or two prints have been taken from the negative. He sends me a photograph, showing a certain amount of half-tone, which was printed from an unmounted photograph laid in contact with the prepared paper, and then submitted to the action of the antimonietted hydrogen gas.

"In copying ferns it is immaterial whether the gas be led into the pressure-frame *behind* the prepared paper, or conducted to the *face* of it by means of a small glass tube. The first-named method will be found on the whole more convenient, but will necessarily take a little longer to allow for diffusion. In all cases it is advisable to dry the gas by interposing a chloride-of-calcium tube between the generator and printing-frame, and the gas is led directly into the latter through an aperture at the back connected with a flexible tube.

"Lastly: Mr. Jones prefers the use of unsized paper, as permitting of a more uniform impregnation with sulphur when moistened with the disulphide solution.

"On my own account I have only to add that these particulars are given more with the view of encouraging further experiments with a newly-observed solar reaction than with the view of detailing a readily-available process for immediate adoption by practical photographers; and this point was, I feel sure, made clear to all attending the meeting."

Meetings of Societies.

EDINBURGH PHOTOGRAPHIC SOCIETY.

A special general meeting of this Society was held in 5, St. Andrew-square, on Wednesday evening, the 21st inst., for the purpose of receiving a report from the Council as to the arrangements for the forthcoming exhibition.

The minutes of the previous meeting were approved, and Messrs. John Lamb and W. S. Muir admitted ordinary members.

The Council, in their report, congratulated the Society on having been granted, by the Lords of the Treasury, the use of the National Galleries in which to hold the exhibition, and stated that, as the result of numerous meetings both as a Council and in Committees, the arrangements were well advanced, and that there was every prospect of a successful issue.

Appended to the report was the following circular, which is intended to be freely circulated both at home and abroad, and which shows pretty fully the intentions of the Council in the matter:—

"The Council of the Edinburgh Photographic Society desire to intimate that they intend to hold an exhibition of photographs, photographic apparatus, and material, in the Royal Scottish Academy National Galleries, the loan of which has been liberally granted for that purpose by the Lords of Her Majesty's Treasury, to be opened on Friday, December 15th, and to continue open until about the middle of January, 1877.

"In addition to the ordinary character of exhibits, it is intended to illustrate, historically and technically, the processes connected with the art through their various stages; and the Council will regard it as a special favour if those having unique specimens, especially of the earlier processes, will kindly lend them for exhibition.

"A series of medals will be awarded for the best pictures, &c., as undernoted.

"*Conditions.*—Pictures intended for exhibition, with the exceptions hereinafter mentioned, must be framed, and have written on the back the name of the photographer, title, process by which produced, price (if for sale), and such other information as may be necessary for the preparation of the catalogue, including the class in which they are to be entered for competition; and delivered carriage paid at the Galleries, addressed 'The Edinburgh Photographic Society, Royal Scottish Academy National Galleries, Edinburgh,' not earlier than *November* 20th, and not later than *December* 1st, both inclusive.

"Pictures from America, India, the colonies, and the continent, may be sent by post, unmounted, and the Council will undertake to get them mounted at the cost of the exhibitors, the expense to be defrayed from the proceeds of the sale of such pictures, in such way as they may determine; and it is to be distinctly understood that unmounted pictures must be delivered not later than *November* 15th.

"In all cases each picture, or case of pictures, must be accompanied by a letter addressed to the Exhibition Secretary, and containing a duplicate of the information on the back of the picture, and anything else that the exhibitor may think necessary.

"The Council undertake to unpack, repack, and return all exhibits remaining unsold, but the return carriage must be paid by the exhibitor; and, while they will take all due care of the property entrusted to them, they will not be responsible for any loss or damage that may occur.

"Arrangements will be made for the sale of pictures exhibited and for duplicates thereof, for which the usual commission of ten per cent. will be charged.

"One room will be set apart for the exhibition of coloured or painted photographs, but such pictures shall not be eligible for competition.

"The following medals will be awarded for the best and second best pictures in the several classes, to be decided according to the opinion of five gentlemen of eminence as artists or photographers, a majority of whom shall be chosen outside the Society; and special judges shall be appointed to decide on the awards for apparatus and material.

"1. A gold medal for the picture which, in the opinion of the judges, possesses the highest degree of merit, irrespective of size or subject.

"2. One silver and one bronze medal for the best and second best landscape of $8\frac{1}{2}$ by $6\frac{1}{2}$ or under.

"3. One silver and one bronze medal for the best and second best landscape above $8\frac{1}{2}$ by $6\frac{1}{2}$.

"4. One silver and one bronze medal for the best and second best portrait from $8\frac{1}{2}$ by $6\frac{1}{2}$ to 15 by 12.

"5. One silver and one bronze medal for the best and second best portrait above 15 by 12.

"6. One silver and one bronze medal for the best and second best landscape, *being the work of an amateur*.

"7 One silver and one bronze medal for the best and second best *genre* picture.

"8. One silver and one bronze medal for the best and second best combination picture.

"9. One silver and one bronze medal for the best and second best single figure study.

"10. One silver and one bronze medal for the best and second best reproduction from painting in oil or water colour.

"11. One silver and one bronze medal for the best and second best enlargement of any subject, and by any process, provided it be the work of the exhibitor, or done on his premises.

"12. One silver and one bronze medal for the best and second best photo-mechanical print.

"13. One silver and one bronze medal for the best and second best enamel.

"14. Three silver and three bronze medals, to be awarded according to the discretion of the judges, for improved apparatus, materials, processes, &c.

"Competitors, with exception of those for the single figure study, must exhibit not less than three pictures.

"Pictures may be sent for exhibition *only*, and *not for competition*, but such reservation must be marked on the back of each, and will be noticed in the catalogue.

"All communications must be addressed to Dr. John Nicol, Exhibition Secretary, 16, Warriston-crescent, Edinburgh."

Considerable difference of opinion was expressed, and a somewhat lengthy discussion took place on the question of medals or awards, but it was ultimately resolved to adopt the report of the Council, subject to the condition that *exhibitors resident in Edinburgh, or who are members of the Society, shall not be entitled to compete.*

VIENNA PHOTOGRAPHIC SOCIETY.

An ordinary meeting of this Society was held on the 9th May last,—the President, Dr. Hornig, in the chair.

On the minutes of the preceding meeting (4th April) being read over,

Herr Jenik said he wished to correct the report of his remarks about carbon tissue. He did not intend to specify the faulty tissue as that of Spencer, Sawyer, Bird and Co., but only to point out "that carbon tissues occasionally seem unequal, as the granularity, which gave rise to the discussion, was not apparent in all the transparencies the tissue for which was cut from the same roll of paper." He was quite aware that the flaw might have been occasioned by some as yet undetected oversight in the manipulation.

Herr Bachrich also wished to say that by the omission of a few words a misleading impression was given of his remarks on the origin of certain surface stains. He was represented as saying those stains were most likely to appear in plates which had not been sufficiently drained, while what he really did say was that they were "most likely to appear on plates sensitised in an old silver bath, as the quantity of ether present would hinder the dripping."

These corrections having been made the minutes were approved and the meeting proceeded with the business of the evening, which opened with the admission of five new members.

Dr. Hornig then said that he had been asked to issue, for the benefit of provincial subscribers, a carbon print as an illustration to the Society's organ. He had long been trying to get a negative for that purpose from a Viennese firm, but up to that time he had been unsuccessful in his applications, though he had not yet given up the project. He then laid on the table the first number of the *Monatschrift für Photographie*, which is the organ of the Frankfort Society for the Cultivation of Photography and Kindred Arts.

Herr G. Märkl, jun., read a paper on his experience in the production of transferable pictures for etching in relief and photolithography.

Herr Luckhardt described M. Hermagis' prismatic photometer and M. Vidal's negative photometer. He remarked that the former was constructed on the same principle as that long recommended by Dr. Vogel, and was not unlike that of the Autotype Company, although the last-named was not divided into so many degrees. The advantage of M. Hermagis' instrument was that, owing to its small size, it might be worn attached to the watch chain as a trinket, while that size was, at the same time, its greatest disadvantage, as it limited the surface to be observed to a very small compass. He (Herr Luckhardt) took advantage of the occasion to refer to Dr. Vogel's opinion that manufacturers of carbon tissue should indicate upon their papers the light required, by means of numbers corresponding to the degrees of some well-known photometer, as by so doing they would save printers the trouble of making a great many experiments. He would also recommend the use of pressure-frames with a rolling shutter, so that the exposure might be terminated with ease and rapidity. With regard to M. Vidal's ingenious little instrument, it had not yet altogether convinced him that experience was not the practical photographer's best negative photometer.

The President then showed two portraits—one of which was printed from an ordinary negative, and the other from a negative prepared by Hommel's plastophotographic process, about the novelty of which there had been a good deal of disputing.

Herr C. Haack showed some negatives which he had produced on the sample of Mr. Warnerke's negative paper which was supplied to him at the previous meeting. The results were not very good, but this he (Herr Haack) attributed to his want of practice, and he had no more material. He did not always succeed in getting the collodion film to lie flat on the glass when being developed, as it was apt to wrinkle up. He also showed two negatives taken by the gelatine emulsion dry process. The emulsion had been prepared a considerable time before being used from the formula given by Mr. King. The only fault Herr Haack had to find with this process was that it required a longer exposure than most other dry processes.

The question box only contained one query, which was sent by a provincial member of the Society. The inquirer wished to know whether anyone in Austrian Hungary had *successfully* applied the carbon process to etching upon zinc. In reply,

Herr Märkl thought that the sender had confounded the carbon with the lichtdruck process. He had, however, once tried to get a picture for etching purposes by means of ordinary carbon tissue; but he was not very successful in his attempts, though he was far from saying that good results might not be obtained by that method. He coated a zinc plate with asphalte, and when it had become dry he developed a carbon picture upon it, the parts of which rendered insoluble by the light formed a covering over the corresponding parts of the asphalte, leaving the other places bare. If a solvent for the resin had then been used the film of asphalte would have been removed, and the metal laid bare at those places unprotected by the carbon tissue, while the covered parts would still form a picture capable of resisting the etching acid. He thought, however, that it would be impossible to etch a carbon print developed directly upon the zinc plate without the intervening layer of asphalte, as chloride of iron is usually recommended for biting-in gelatine pictures, and compounds of iron are quite unsuited for the etching of zinc, on account of the readiness with which the chloride combines with the zinc to form chlorate of zinc.

After the transaction of some purely local business the meeting was adjourned.

Correspondence.

EBONITE BATHS AND FILTRATION.

To the Editors.

Gentlemen,—Will you permit me to place on record, for the benefit of others who may be placed in a similar position, a small item of experience I have recently acquired in connection with an old and tried ebonite bath which has never yet played me a bad trick, and in which I have kept a silver bath for many months at a time without its undergoing any change for the worse?

Having had occasion to keep the water-tight cover screwed closely on it for three months during last winter, I found to my extreme annoyance that when I wanted to remove the cover it declined to come off; and I then recollected that I had on previous occasions experienced the same kind of difficulty, although never in such a strongly-marked manner, owing, probably, to the cover never having been previously left undisturbed for so long a period. After a severe struggle, in which I thought I should have had to effect the desired separation of the bath and its lid by means of a saw, I eventually got them separated, and found that the elastic rubber of the cover had in some way or other become assimilated to the rubber forming the ebonite body of the bath, so as to have led to their complete adhesion.

Cogitating over this unpleasant circumstance, I remembered the excellent service once rendered to me by a very thin film of paraffine when employed to prevent two pieces of rubber becoming adherent. I smoothed the top of the bath by a file, warmed it well, and rubbed over it a small piece of solid paraffine, and while it was still in a molten condition I brushed off what was superfluous. I did the same thing with the rubber cover of the bath; and, to cut a long story short, there has never since been the slightest sign of adhesion, for the moment the clamps are removed the cover actually *falls* off the bath.

This is a very small matter about which to write, but I had already suffered so much inconvenience, and am now so completely rid of all annoyance, that I cannot but imagine my experience will be made available by other readers of The British Journal of Photography—especially at this hot season, when tourists are "on the wing," and when the evil complained of finds its most perfect development.

While I have pen in hand, I take occasion to indicate what I have found to be a great improvement upon filtering paper for filtering a silver bath. Filter papers are often provocative of bad thoughts, if not bad language; for at an unforseen moment the texture of the paper gives way, and one's bath becomes in an instant the recipient of all the refuse in the funnel. A tuft of cotton wool rammed, not too tight, into the nozzle of the funnel answers every purpose, and is quite free from objections.—I am, yours, &c., X. Y. Z.

Carlton Club, June 27, 1876.

Photographing Prisoners.—In the House of Lords, on Tuesday evening last, Earl Beauchamp, in moving the second reading of the Prevention of Crimes Act Amendment Bill, which had come up from the Commons, said that its object was to enable the Government to define the class of prisoners to whom registration and photography under the Prevention of Crimes Act should apply. It had been found by

experience that the number of identifications from registration and photographs had not borne so large a proportion to that of the number of prisoners registered and photographed as had been expected. When prisoners of a very tender age were photographed the advantage as regarded subsequent identification was very slight indeed. Again, in very many cases the police were able to identify from memory. Gaolers and the police were able generally to form a good idea as to the prisoners who ought to be photographed, and this Bill would enable the Government to exercise a discretion in the matter which at present was not permitted.

Note on the New Nitrate of Lead and Ferrid-Cyanide of Potassium Intensifier.—The following short communication to the Photographic Society of Great Britain was read at the meeting held on Tuesday, the 13th inst.:—"It may be of interest to some of the members of the Society to know that I have found the formula recommended by Messrs. Eder and Tòth answer admirably to replace the bichloride of mercury as an intensifying agent for the negatives of maps and plans intended for photolithography. I have also succeeded in replacing the hydrosulphate of ammonia, when using the lead intensifier, by a saturated solution of bichromate of potash, which produces a very opaque yellow film. The bichromate, however, is liable to cause closing up of the lines. One of my assistants has, however, succeeded well in obtaining a dense black or dark brown film with clear lines by applying to the negative, after treatment with the lead solution, a solution of iodide of iron, which is followed, after a thorough washing, by a solution of permanganate of potash. The most suitable strength of these solutions has not yet been fixed.—J. Waterhouse, *Capt.*"

Honorary Degrees to Photographers.—Two gentlemen well known respectively in connection with photo-chemical and optical science, Professor J. Emerson Reynolds and Mr. Howard Grubb, have been the recipients of well-merited honours. At a recent meeting of the Senate of the University of Dublin, the Rev. Wm. Roberts, as Senior Proctor, brought forward a recommendation to confer an honorary degree of M.D., upon the distinguished Professor of Chemistry, James Emerson Reynolds—a gentleman who, he said, had given ample proofs of his originality and industry in the field of scientific research. He might refer to his important discovery of sulphur-urea, and his paper on the silicates; and if it be true that *les bons eleves font la gloire du maitre*, he had another high claim to the distinction they asked the Senate to confer upon him in the list of his pupils who had obtained the highest honours that were conferred in the University for proficiency in chemical science. There was a further recommendation to confer an honorary degree of Master in Engineering on Howard Grubb, who had devoted himself with singular zeal and success to the improvement of optical instruments, and had supplied many such to foreign observatories, thus gaining for himself a well-earned reputation, as well as conferring honour on his country. The Rev. Dr. Haughton said Mr. Grubb owed his entire training to Trinity College. He was one of the most distinguished pupils in the Engineering School, and he obtained the highest distinctions in his college career. Although the University could not claim to have educated him in the speciality in which he had become distinguished, yet it had laid the foundation upon which he had successfully worked.—The recommendations were adopted.

ANSWERS TO CORRESPONDENTS.

☞ *Correspondents should never write on both sides of the paper.*

E. Dunmore.—In our next.

B. W. F.—The paper is quite untrustworthy. It would be sure to give way in the midst of the operation.

Alex. Ayton.—Thanks. The specimens enclosed are charming. In the course of a few days your request will be complied with.

G. H. B.—1. The restraining acid referred to is *aqua regia*, about one drop to the ounce.—2. Ten ounces.—3. The preservative is removed by washing.

A. Adams.—China ink dissolved in water is the material most commonly employed. A little dexterity in applying it will be required, as the writing must be reversed.

G. P.—The expenditure of hyposulphite of soda in your fixing operations is certainly very great; and we believe that you might reduce the quantity to one-half with perfect safety.

Cadmus.—See the article by Captain Fox in our present year's Almanac. The process there described will answer your purpose; at anyrate we believe it to be the nearest to what you desire.

Panoramic.—We shall reserve your letter for further examination. In the meantime we may inform you that Sutton's panoramic camera is not like that which you describe, but is an ordinary stationary camera with a slide to hold a cylindrical plate, the lens being a globe filled with water.

J. Thomson.—Our correspondent suggests, as a method of obviating the difficulty experienced in getting pigments in a sufficiently fine state of division for making transparencies for enlargements, the making of a gelatine emulsion of one of the cheaper metals; for example, by adding nitrate of mercury to a solution of gelatine and then adding a solution of potash, by which mercurial oxide would be precipitated in a state of very fine division. The emulsion should now be poured out to set, and all soluble matter having been washed away the making of the tissue may be proceeded with as usual.

J. P.—1. The infusion of hops is intended to take the place of the beer.—2. Yes.—3. About a minute, although a shorter period will answer.—4. The keeping qualities of the plates can only be accurately ascertained by time; but we have, by washing, removed the preservative from the tannin plates of Major Russell, as long ago recommended by that gentleman, and have not found their keeping qualities thereby impaired.

E. V. E.—1. A background such as you desire can be prepared either with distemper or flatted oils.—2. There is a far greater chance of making a fairly good negative of a wrongly-exposed *dry* plate than a wet one.—3. The Secretary of the Liverpool Amateur Photographic Association (Mr. W. Murray, 58, Dale-street, Liverpool) will, on application, furnish you with full particulars. We strongly advise you to join that society.

An Intending Traveller.—After carefully perusing your long but interesting letter we advise you not to take a *photographic* camera with you on your travels, but instead of it a *camera obscura*, by which we here mean a camera constructed for making drawings. A camera lucida would probably answer your purpose equally well, with the additional advantageous feature that it could be very easily carried in your trousers pocket.

W. A. R.—Numbers 2, 7, and 9 on your list are all alike, differing only in respect of name. The last two of these are *slightly* more rapid than the first, owing to their having no fixed central stop. Either of these three will answer your purpose much better than the others, possessing all the advantages they have with a few more peculiar to themselves. Seeing you are not quite "up" in the matter we shall be happy to aid you to any further extent

J. Dawson.—There are several causes by which such stains as those referred to may be originated. We believe the best remedy in your case will be to try a ripe, old collodion giving a film of a somewhat porous nature. Try also the effect of placing blotting-paper under the corners of the plate, so as to ensure the absorption of the superfluous silver. We have known this simple method of procedure to entirely prevent the formation of such markings as those to which you have directed our attention.

H. B. Berkeley.—Your communication received just as we are making ready for press. In reply to some of the queries:—While good central definition may be obtained by placing the stop behind the lens—the convex surface of the lens being directed towards the view—it will be found that the area of good definition is greatly limited, it being impossible to cover a large field in this way. It is always best when a single lens is being used to place it behind the stop, with the convex surface towards the ground glass. This applies to either front or back lens of a combination of the doublet form. The cap was forwarded.

Old Rector.—Several years ago it was anticipated that the then newly-discovered method of parchmentising paper would prove serviceable in photography, and there was good reason for indulging in the anticipation; for by the conversion of the paper, which bore the print, into parchment the pores were rendered closer, and the sharpness improved, while any trace of hyposulphite of soda that might have remained in the picture was completely removed. But notwithstanding this, the fact is indisputable that beyond a few experiments tried many years ago the parchmentising of photographs never reached the goal of actual practice.

F. J. W.—Writes:—"I have had made a drying-box on the principle of one lately sketched out in The British Journal of Photography; but it is in the rough, and I wish, for sightliness, to varnish it. Would it do to have it done *inside* and out with Brunswick black? or would that preparation have any deleterious effect on the plates whilst drying? I have had it made, more especially, to try Canon Beechey's process, and think it will also do to dry the tissue when I wish to print in carbon. A hint in this direction, with your usual kindness, will oblige."——In reply: the best way to proceed is to *stain* the box black by a solution of sulphate of iron followed by an infusion of logwood; and when this has become quite dry apply a coating of white, hard, spirit varnish. This will possess none of the objectionable features of Brunswick black.

Baynham Jones.—We are much pleased to find that our friend Mr. Jones is about to give the hop preservative a trial. In a note just received from him he says:—"I this morning made some hop solution, which I have for some months past intended to try, but not knowing the proper strength I referred to your leader in the Journal of the 16th. Thinking the proportion of hops very large I referred to a very useful little book, *Look Within for Everything*, and under the head 'Brewing' found Burton ale, and the quantity of hops two ounces to the gallon, whereas you gave that quantity to twenty ounces of water—just eight times as strong as the ale. I have made the weaker solution and will let you know the result. I think I shall find my pictures some three or four times quicker than yours; but—*nous verrons*."——We shall be gratified by being informed of the degree of success attending Mr. Jones's efforts.

☞ **Editorial Communications should be addressed to "THE EDITORS"—Advertisements and Business Letters to "THE PUBLISHER"—at the Offices, 2. York-Street, Covent Garden, London, W.C.**

CONTENTS.

THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 844. Vol. XXIII.—JULY 7, 1876.

A READY MEANS OF PROPERLY ADJUSTING THE RELATIVE PROPORTIONS OF BROMIDE AND SILVER SALTS IN EMULSIONS.

After all that has been written on the preparation, relative proportions of material, and properties of emulsions, it may be supposed that there can be little more left to be said on the subject; and if we are to judge only from the large measure of success which is being attained by the many experienced workers who have gone, *con amore*, into it, the supposition would not be very far from the truth. But, great as has been the success of those who have brought experience to bear on the somewhat delicate operations involved in the production of the best variety of emulsions, we have abundant evidence that there are very many earnest photographers who, notwithstanding the expenditure of much time and trouble, have met with such poor success in emulsion work that they are fain to stick to the older but, in their hands, more certain method with the bath. Now it will be generally admitted that, given a tolerably rapid emulsion in perfect working order, the whole manipulation in the production of landscape negatives of the highest class is so extremely simple and certain that, *cæteris paribus*, no one who has fairly tried it will ever have recourse to the bath again. For the fact, then, that many have, after much patient trial of emulsion work, returned to the older method, there must be both a cause and a remedy; and our object now is to point out what will probably be found to be the one, and to suggest what is equally likely to prove the other.

No one who has carefully followed the discussion on the relative quantities of bromides and silver that should be employed in the formation of the best emulsions can have failed to observe that the highest degree of success depends much on the accurate adjustment of the proportions of these bodies, and that is just the point at which the inexperienced are most likely to fail. The fact is that, although chemistry is in the highest sense of the term an exact science, and that the combining proportions of most of the elements, and through them their combinations, have been unmistakably ascertained, yet as absolute purity is the exception and not the rule, and hygrometric conditions vary with almost every different sample, the practical combining number of a compound is often widely different from the theoretical. This is a fact that any one may readily prove to his own satisfaction, if he will—as we did during the past week—procure a number of samples of bromides of cadmium and ammonium and nitrate of silver from various sources, dissolve them in accurately-measured quantities of water, and carefully note the varying proportions required to complete the double decomposition that takes place when they are mixed. While we know that results of great excellence may be obtained by most of the methods which have been from time to time recommended in our pages, and that by some of them a high degree of sensitiveness is attained, yet we think the balance of evidence is in favour of the fact that, for fine printing quality of negative and the simplicity and certainty with which it is produced, an emulsion containing just the faintest possible trace of free bromide is to be preferred. We say "just the faintest trace," as it is well understood that sensitiveness diminishes precisely in proportion as the bromide is increased.

This being admitted, it will be evident that the best emulsion will necessarily be the result of careful weighing and measuring of the material of which it is composed; but how can that exact result be attained when the material itself varies so much in the actual qualities of the elements of which it is composed? Simply enough for those who care to lay in a sufficiently large supply to last them for a season, as by "trial and error" they may ascertain, once for all, the exact number of grains of each substance that will leave the emulsion in the best condition; but somewhat harassing to those who work from "hand to mouth," and have the same difficulties to encounter with each operation. As the result of many experiments we can say, with confidence, that an emulsion prepared according to a formula which we published some years ago, and corrected or adjusted in the way about to be recommended, will, with very short exposures, give excellent results, and develope up to fine printing density by the ordinary alkaline developer. Fifty-four grains of crystallised cadmium bromide and twenty-seven grains of ammonium bromide are dissolved in three ounces of alcohol; to this is added a sufficient quantity of pyroxyline, and afterwards six ounces of sulphuric ether. This should stand until quite bright, for it seems to become better the longer it is kept. It forms a bromised collodion containing nine grains of the mixed bromides per ounce. When about to be sensitised it is decanted, and to two drachms of alcohol for each ounce is added twelve grains (to each two drachms) of silver nitrate, which is dissolved by heat in the usual way, and added to the collodion. Theoretically this should leave a slight excess of bromide, but practically the silver will generally be found in excess; should such not be the case an additional grain of silver may be added to each ounce. The emulsion should be allowed to stand for twenty-four hours, and be then adjusted as follows:—Having ready a saturated solution of silver in alcohol, and also one of ammonium bromide, a little of the emulsion is to be poured into some distilled water in a test tube and well shaken. In a few seconds the pyroxyline, carrying with it the silver bromide, will fall to the bottom, leaving the liquid above quite clear. To this a few drops of the silver solution is added, when, if a bromide be in excess, the liquid will assume a milky appearance, in which case silver must be added, and the test repeated till the milky appearance is just precipitable. Should no precipitate be formed on the addition of the silver the probability will be that there is an excess of silver, and the alcoholic solution of bromide must be added to the emulsion, and the tests repeated till the desired conditions are attained. In this way the proper adjustment of the salts may be secured in less time than it takes to write about it.

We do not, of course, say that an emulsion so made and adjusted is better than, or perhaps equal to, some of those made according to the formulæ of several of the more experienced workers; but we strongly recommend it to the attention of those who are not much accustomed to very accurate weighing and measuring, or who may not be quite at home in the art of estimating exactly the ordinary impurities of commercial salts, as a means of making a

thoroughly reliable emulsion, easily worked, and capable of giving, with the smallest possible trouble, results of the very highest quality.

ON INTENSIFICATION BY MEANS OF CHLORIDE OF GOLD.

Since our remarks a fortnight since upon Mr. M. Carey Lea's recently-published method of intensification we have had the opportunity of carefully trying it against other methods, and are now in a position to give the result of our experiments. As we then noticed, it is identical in action with the plan we proposed last year in which chloride of copper replaces the gold salt in the first portion of the operation; but, as might naturally be expected, the change in the metal employed is found to give rise to many little differences in action as well as effect when we compare the behaviour of the two formulæ. Foremost amongst such points of difference may be mentioned the colour of the image—a not unimportant matter even when density is the sole object to be attained; but, as it seems probable that these or similar means will be resorted to with advantage for obtaining rich tones in transparencies, the subject of carbon becomes of greater interest.

While similar in action to chloride of copper, the gold salt appears in some cases to exercise a very different effect; not that we can discover any specific variation between the action of the two salts, but rather accidental circumstances which favour either one or the other. We have found, for instance, that some plates which have resisted the action of the copper intensifier have been easily acted upon by the gold solution, while, on the other hand, the direct opposite has occurred. What the cause of this difference in action may be we are unable even to guess, for the materials employed in our experiments have been the same throughout. As compared with copper we found gold to be, strength for strength, much more energetic in its action, though as regards ultimate effect we could recognise no advantage. We adhered almost completely to Mr. Lea's instructions, and with the strength of solution recommended by him were unable to produce any greater density than is obtainable with copper, though it will be borne in mind that the latter is used in much stronger solution. How far, however, strength of solution affects density we cannot say, but to a slight extent it exercises an influence upon the ultimate colour of the image which may or may not render the negative actinically denser. The colour, as we have previously remarked, differs from that produced by copper, tending more towards the various shades of rich purple or neutral black, while the other rather leans to the side of brown of different degrees of warmth.

Mr. Lea in his instructions depends for his ultimate effect upon the extent to which the action of the gold solution is carried. This, we think, is apt to give rise to uncertainty, as it is extremely difficult to judge of the exact amount of treatment necessary for negatives of different density. Our own plan is to allow the chlorising action to be complete, and to trust to the alkaline developer for the amount of density. We have spoken above of the use of Mr. Lea's method for toning transparencies, and to some it may appear a work of supererogation to go through the double labour of chlorising and redeveloping when the gold solution might be employed direct; but we can assure them that for richness of tone there is no comparison between the two. We have secured a great range of tones by employing a mixture of gold and copper chlorides in various proportions.

THE NEGATIVE BATH.

Given: a dozen practical photographers—especially *professional* photographers—gathered together. If, after having exhausted current topics, they find themselves relapsing into a listless condition, one of the number has only to introduce the subject of the nitrate bath and its vagaries and, presto! extraordinary vitality is instantly imported into the now "charmed circle." Warmth and activity at once succeed stupor and torpidity.

The proverb says that "light comes from the east." although, *apropos* of this, one of the transatlantic speakers at the great international photographic dinner at Brighton in 1872* said that, however the eastern sky might be illuminated, it was always on the western mountain peaks one first caught sight of the sun's full glory. Slow, indeed, must have been the transmission of the luminous rays from east to west when we find that only at the present time is there an indication that the "western mountain peaks" are being illumined by rays emitted from this country so long back as 1866. The special subject to which these remarks apply is the improvement of a badly-working negative bath by the addition of cyanide of potassium, which, "strong to kill"—even to the precipitation of every atom of silver in a bath—is also "strong to cure" several disorders of that all-important adjunct of wet-plate photography.

A correspondent in the last number of *Anthony's Bulletin* becomes eloquent over a hint which, in his estimation, is worth the amount of five years' subscription to our contemporary. We greatly rejoice to see that enthusiasm prevails to such an extent in the west as to permit of such outspokenness as that displayed by the correspondent to which we have referred—Mr. Dunwick, of Washington. The "new idea" which he had discovered three months prior to the date of his communication consists in "simply working the negative bath perfectly alkali and the collodion acid. A clean piece of cyanide is dissolved in a small quantity of water; I generally use a saturated solution. Add a few drops to the bath until you throw down a small quantity of cyanide of silver, which will very soon settle to the bottom; then sun until clear; filter, and it is ready for use." We give the extract *verbatim et literatim*. This is the treatment recommended for the bath. Readers of this Journal of about a dozen years standing will remember that at a meeting of the Sheffield Photographic Society Mr. James Tulley read a paper in which he detailed his experience with the nitrate bath, the leading feature in his paper being the fact that he kept his bath in good working order by occasionally pouring into it a few drops of a strong solution of cyanide of potassium until a flocculent precipitate took place, after which it was filtered, and became in good working order. This previously unheard-of treatment was strongly denounced by some as being empirical whilst by others it was strongly approved of as being an excellent remedy for a bath producing fogging and pinholes, when other remedies had failed. But "empirical" and "unscientific" as it was deemed, there is no doubt that it effected the end desired, namely, the securing of clean, good, negatives from a bath which, previous to this summary treatment, yielded negatives weak, full of pinholes, and otherwise objectionable.

Since the date of the treatment just mentioned the ranks of photography have been swelled by large accessions of those who are unacquainted with all that has transpired in bygone days; hence we have no hesitation in giving our American friends all necessary credit for independent discovery.

When cyanide of potassium is added to a silver bath the cyanide of silver which is formed is precipitated, causing, as a secondary formation, nitrate of potash, which, being soluble, remains present in the bath. But it has been shown by Mr. T. Sebastian Davis, at a meeting of the South London Photographic Society, that when a bath has been treated with cyanide in the manner described an entirely different effect is produced than would have followed the mere addition of a solution of nitrate of potash to the bath. In some specimens which we recollect Mr. Davis exhibiting there was a peculiar bloom, which was believed to be attributable to some unknown influence exercised by the cyanide. It is probable that a bath which has undergone the treatment suggested will be found to be composed, not only of the nitrate of silver and iodide of silver which we know is present in solution in every bath, but the nitrate *plus* iodide *and* cyanide. Be this as it may, we have verified more than once or twice the allegation that most desirable results are usually obtained by adding to a disorganised bath a few drops of a solution of cyanide of potassium.

But our American friends now go a little further than this, for the correspondent of our contemporary above-named adds acetic acid to his collodion, in the proportion of eight drops to six ounces. He

* Reported in full in our nineteenth volume, page 519.

finds that, by using an acid collodion of this kind in a bath that has been treated with cyanide, pictures of good quality may be taken with an exposure not much over half of what would have been required without the adoption of the modifications mentioned. We know that the addition of free iodine in the form of tincture of iodine is of very great service in causing some descriptions of collodion, especially if new, to work clean and well. We know, further, that the addition of acid to collodion liberates iodine to such an extent as to cause it to work cleanly if it had not done so previously; but we have not before seen a special claim made for the rapidity arising from the presence of acetic acid in the collodion. However, Mr. Dunwick avers that "the addition of the acid makes any collodion work cleaner and quicker, and forms acetate of silver in the film and makes it more sensitive." We have no doubt that this assertion will speedily be subjected to the test of experiment in this country as well as at Washington.

In our last number we expressed our conviction that the members of the Edinburgh Photographic Society, in their determination to award medals at the forthcoming exhibition, had not acted with their usual wisdom. Foreseeing the possibility of unpleasantness arising out of the medal awards determined upon, we, in the article referred to, were still able to express satisfaction at even a gleam of sunshine amid the impending mists, which slight luminosity owed its origin to a resolution adopted by a previous meeting, to the effect that competition for medals would be confined to those who were neither members of the Society nor residents of the city in which the exhibition was to be held. With much regret we perceive, from a report of a special meeting to be found in another page, that this enforced local *hors concours* in connection with the approaching exhibition no longer exists, and that the members of the Society, in which is included a large proportion of the professional photographers of Edinburgh, may now compete for medals. Viewing this matter from a distance, and not without some acquaintance with the various gentlemen composing the Society and with the photographic artists in the "Modern Athens," we are perhaps the better able to predicate the effects not unlikely to arise should the competition take place as now decided upon. In order to prevent the harmony of the Society being interrupted in a manner which may with difficulty admit of the healing action of "Time, the corrector," we strongly urge upon the leading professional men in Edinburgh the propriety of announcing the works they contribute as being "not for competition;" and the more generally this course is followed the less danger there is likely to arise from the adoption of a policy which is fraught with peril to the best interests of one of the most active photographic societies at present existing.

To those of our readers who have experimented with washed emulsions and failed, the following hint may prove of use:—It is a very common complaint that the dried pellicle will not redissolve; we find, indeed, that most who try it for the first time get into difficulties over the formation of the emulsion. The remedy is, however, so easy, and has been pointed out so frequently by ourselves and others, that we are surprised at the difficulty continuing to exist. Its very simplicity, no doubt, causes it to be passed over unnoticed; whereas one trial will be sufficient to convice any one of its complete efficacy. The general cause of the apparent insolubility of the dried pellicle is to be traced to the use of too small a bottle for the solution, the consequence of which is that the pellicle, becoming softened, adheres tenaciously in a mass to the bottom or sides of the bottle, whence it is impossible to remove it with the slight amount of agitation which can be brought to bear upon it. If, however, the emulsion be made in a bottle capable of holding at least two or three times the quantity, the extra space allows of the liquid being violently dashed about and thoroughly mixed with very little trouble, a few vigorous shakes being sufficient to remove any adherent particles and set them in rapid motion in the solvents. The effect produced by this simple expedient is really wonderful. A gentleman some months ago applied to us in distress, being unable to dissolve a quantity of pellicle he had prepared, though it had been in the solvents for several weeks, and had been shaken every day. Upon transferring it to a larger bottle the difficulty immediately disappeared.

THE COLLOCINE DEVELOPER.

Collocine, like other novelties, has its share of laudatory and disparaging criticism, and as I gave at a recent meeting of one of our societies, where the subject was discussed, an opinion adverse to its use, I feel bound to qualify that opinion and give a more commendatory one as the results of further experiments and repeated trials.

Like all developers into which gelatine enters there is formed a rather harder negative—a negative that will give a proof with greater contrast than when it is absent. I think the necessary result—clear shadows—when gelatine in any form is used, cannot always be said to be an advantage; in fact, except for special subjects, clear shadows are to be avoided. This quality indicates slow decomposition of the silver solution where the lights on the picture get more than their proper share of deposit, and the development of the negative must, to avoid chalkiness, be stopped before all the detail in the shadows is well out. That collocine will in an extraordinary degree retard this decomposition is undoubtedly the case. The "reason why" has yet to be discovered.

Equal portions of this developer (I may here say the formula for it with which I have been experimenting was that published by Mr. M. Carey Lea and afterwards by Mr. Brooks, containing a larger proportion of collocine than has been subsequently recommended) and of a thirty-grain solution of silver nitrate will not become turbid for some minutes after being mixed together—an effect that would take place immediately with the ordinary iron developer. I have experimented all along with the same batch of solution, made about a couple of months since and kept in the same bottle. It has become of a very pale straw colour, and has made a singularly bright yellow deposit on the inside of the bottle, totally distinct in colour from the deposit usually made from iron solutions; likewise a flocculent brown deposit on the bottom of the vessel about a quarter of an inch in depth.

As compared with the ordinary iron developer I find it slower in action, but giving a very satisfactory image. This, of course, means that a longer exposure is required to get a soft negative of the best printing quality, suggesting its use for brightly-lit objects or such as are deficient in contrast. At any rate, photographers may thank Mr. Lea for introducing a useful chemical, and reducing the price of the developer to the smallest possible amount.

Edward Dunmore.

NOTES ON PASSING EVENTS.

By a Peripatetic Photographer.

On glancing at the incidents of the past month, the first place in such importance as attaches to these "passing events" must be assigned to the panoramic system of Mr. Warnerke, which I may note, in passing, was published primarily through the columns of The British Journal of Photography, and afterwards brought before the Photographic Society of Great Britain. The paramount advantage in the Warnerke system is that one can either take an ordinary or a panoramic view, just as the subject admits. If one come upon a pleasant view, and after it is projected on the ground glass he finds that justice cannot be done to the subject unless another hill be included, or the extension of a lake made, all he has to do is to take his first view (which may afterwards be considered as a picture complete in itself, should it be so desired), then rotate the camera on its axis, and "blaze away" at the adjoining portion of the scenery, assured that he can afterwards effect such a junction between both negatives as will stand the scrutinising eye of the expert. It is this that confers so much value upon the method in question. Possessing all the features of an ordinary landscape camera, it has, superadded, those of a panoramic camera.

Observing that a correspondent of this Journal desires information with respect to the commercial propriety of undertaking a voyage to the Arctic regions with the view of securing the eggs which are there so plentiful, I offer a suggestion to the effect that dried albumen is of but little use at present in photography, but in other branches of commerce it is much more abundantly utilised. It is in certain ramifications of what is known as the "Manchester trade" that dried albumen is most extensively employed, the dyeing of the textile fabrics of "Cottonopolis" being the special department in which this

substance is most in demand. I recollect that in the days of yore, when the negative albumen process on glass was better known and more extensively practised than is now the case, long discussions sometimes took place regarding the best source from whence to obtain albumen, and I further recollect how that, while some advocated the albumen from hens' eggs and others that from the egg of the domestic duck, there was a third party who affirmed that the best albumen for negative photographic purposes was obtained from that portion of the feathered tribe whose habitat was "by the sad sea waves." What special virtue there may be supposed to reside in the eggs of sea-fowl I am unable to indicate. Living, as they do, upon fish their eggs ought certainly to be very rich in albumen.

After perusing the welcome details of Mr. Henderson's enamel process—the patent of which has been completed—I perceive that its primary feature consists in toning a transparency with an iodide or bromide of a metal instead of with a chloride as formerly, the toning solution being further enriched by the addition of a mordant such as the bichloride of tin, and a silicate such as that of potash. In none of the previously-published instructions for enamelling have I ever seen mention made of either a mordant or a silicate; and, whatever part the mordant may take—the action of which I scarcely at present understand—the function of the silicate will be very apparent, for it is to it that the rich glaze is evidently due. It is, doubtless, better that a vitreous glaze should be imparted in this manner than by "fluxing" at a further advanced stage, according to the method which has hitherto prevailed.

The question has been asked—Should photographers prepare their own materials? It may be very unwise for them to do so, but it is still more unwise for anyone not to be in a position to do so should occasion demand it. The making of collodion, nitrate of silver, albumenised paper, chloride of gold, and cyanide of potassium should form a part of the curriculum in every young photographer's education. Of course I do not advocate this with the intention of suggesting that a photographer should manufacture these and other things for himself, but only as a part of his educational course. It would be highly inexpedient for any person attempting, in the ordinary course of things, to manufacture for himself that which he could purchase at a far less price; but "knowledge is power," and this kind of practical discipline may, sometime or other, prove of great utility to its possessor, while the fact of the possession of such knowledge will be a source of pleasure at all times. I am acquainted with one very successful photographer who himself prepares every drop of collodion he uses, and, if I am not greatly mistaken, he is about to carry this manufacturing proclivity into other departments, so great is the satisfaction he derives from this procedure; yet I do not recommend that the practice should be followed generally.

A suggestion has been several times made to employ the radiometer of Mr. Crookes as a photometer, and pretty anticipations have been hazarded as to its great utility when placed by the side or on the top of the camera, the photographer regulating the exposure of the plate in the camera by the rapidity of its rotations. But, unfortunately, it is now claimed for the radiometer that it will rotate in darkness—that it is amenable to the impact of other than rays of light—that, in short, heat as well as light forms a motive power. It may be said that heat and light are the same thing. To this, however, I reply that by heat I here mean that influence radiated from a heated iron ball by which a warm glow is sent into one's previously-chilled fingers; while by light I mean the influence by which a photographer is enabled to imprint an image of a sitter or a landscape upon a sensitive plate through the agency of a camera and lens. These two influences are *not* the same thing. My definition may be a little unscientific in these days of "ethereal vibrations;" but I venture to believe that it will be understood. The radiometer, therefore, will not answer as a photographer's actinometer so well as gazing into the eyes of a steady old tabby, and watching to what extent the vertical pupils of the feline optics are opened or contracted—a result, as every child knows, produced by the greater or less intensity of light.

AN IMPROVED MECHANICAL PRINTING PROCESS.

[From the following very practical article, communicated to the *Moniteur* by M. de Courten, it will be seen that he has made a considerable departure from the process of mechanical printing first published by M. Albert.—Eds.]

When, in 1872, I had occasion to admire the splendid works in photography produced by the Albertype process, I had for my guidance in pursuing my experiments in the studio certain formulæ given to me; but, doubtless owing to an excessive prudence, or, rather, to an exaggerated fear of my powers of application and observation, these formulæ were so imperfect as to be totally useless. It was not, therefore, to be wondered at that success was impossible when the instructions were compiled with a design to mislead an operator. What those formulæ were I shall not inform the reader, for I hold sacred the promise I made then that I should not reveal the process communicated to me.

But as the result of careful study and application, together with my former experience, of which I gained a little here and a little there, I have been enabled to combine a process of photography which, I believe, will be found to be most excellent and reliable in practice. Among the purposes for which it is adapted it will be found of especial value in the reproduction of works of art; indeed, it cannot fail to prove useful to every photographer who does not object to a moderate outlay in procuring the various materials required. I find that many of the treatises recently published give these processes in such complicated and incorrect ways as to yield results which are very unsatisfactory. I believe that with skill and intelligence the method now to be described will render excellent service to those engaged in the photographic art; but, above all, its utility will be found in its application to the reproduction of drawings in half-tint. The delicacy and the most exquisite grades of a picture are here rendered with absolute fidelity, and vie with the numerous specimens obtained by the salts of silver.

The method of operating is as follows:—Select plates of glass as flat and uniform in thickness as possible. The dimensions must be carefully adjusted to suit the printing-press, and the corners must be rounded to prevent accidents. The necessity for this will be recognised when it is remembered that the glass plate is to act the part of a lithographic stone, and must be treated as such; hence the uniformity of the thickness, which establishes a perfect parallelism of the two surfaces of the glass, is a matter of high importance.

In cleaning the glass the operation is effected as in photography the surface must be wetted with alcohol and well rubbed before use. This ensures the adhesion of the printing surface of gelatine, which might otherwise rise in blisters, owing to the non-adhesion caused by greasiness. The great necessity for perfect cleanliness of the surface cannot be too strongly impressed. One plate of glass may be used several times, and in this case it must be cleaned with great care with nitric acid, or with a solution of caustic potash in hot water, using friction with either a hard brush or a compact pad of any material that will not scratch or injure the surface of the glass.

The Preparation of the Sensitive Material.—Provide two vessels of glass, and place in one of them gelatine ten grammes, distilled water (cold) 250 cubic centimètres. Allow this to stand until the gelatine has become swollen. In the second vessel put bichromate of potash ten grammes, distilled water 250 cubic centimètres.

These vessels are then placed in a water bath, the temperature of which must be kept up to 120° Fah. When all is dissolved filter the gelatine through linen in a vessel or glass placed in a water bath; add to it the solution of bichromate of potash, and allow the mixture to cool. To this is added, little by little, 250 cubic centimètres of albumen previously beaten to a froth and then allowed to subside. It is best to procure quite fresh eggs, for this has a very great influence on the subsequent operations. It is important that the mixture be cooled to such a degree of temperature as will prevent the coagulation of the albumen. Last of all filter the mixture, the glass funnel being placed in an apparatus of tin filled with hot water to facilitate the filtration; the temperature must not exceed 95° Fah. After filtering replace the vessel in the water bath, where it ought to remain about one hour, taking care not to allow the heat to be raised above 104° Fah.

Cte. Ludovico de Courten.

(To be continued.)

FOREIGN NOTES AND NEWS.

A New Method of Silvering Mirrors.—Half-tones for Phototypes.—Etched Borders for Carbon Transparencies.—Etching and Engraving upon Glass.—Imitation Etched Photographs.—Intensity of Various Coloured Lights.

The principle of depositing metallic silver on a surface of glass so as to form a mirror is too well known to the readers of this Journal to require any explanation here; and from year to year the best methods of effecting the deposition of the silver are described in our Almanac. Mirrors produced by this deposition process, which was first discovered by Drayton, in 1840, have now almost entirely superseded reversing prisms for photography,

metallic specula for telescopes, and are becoming generally introduced for domestic purposes in lieu of the old mirror, which was silvered by means of an amalgamation of mercury and tinfoil.

Among the numerous advantages possessed by the pure silver over the mercury mirrors are the non-deleterious nature of the work upon the health of the workmen, the reduced cost of production, the brief period in which the silvering can be effected, and the ability of using either side of the glass as a mirror. The following defects have, however, been urged in connection with the mirrors produced according to this system—a yellow tint peculiar to metallic silver, the occasional non-adhesion of the film of silver, especially when exposed to strong light, and, finally, the deterioration of the purity of the reflecting surface owing to the action of sulphuretted hydrogen or other deleterious gases in the atmosphere, and which even thick varnish has not proved able to prevent.

To obviate these objections M. Lenoir has devised a new method which combines the best features of both the mercury and silver systems, and is, in fact, a combination of both. The mirror is first silvered by any of the well-known methods which demand the use of tartaric acid or grape sugar to reduce the silver from the ammonio-nitrate solution, and when a proper coating has been given to the glass in this way, the surface of the metallic film is washed and a very weak mixed solution of cyanide of mercury and cyanide of potassium is poured over the surface. The silver displaces part of the mercury and is dissolved. A portion of the silver combines with the mercury, forming a very pure and white amalgam much superior to the silver itself in its freedom from colour, while the adhesion to the glass is most intimate. The reaction by which this change is produced takes place almost as soon as the liquid comes into contact with the metallic layer on the glass. Those who have seen the mirrors silvered by this process of M. Lenoir speak in high terms of their beauty. No objection can be urged on the score of the health of the workmen employed, for the cyanides of mercury and of potassium are employed in such an extremely diluted condition as to render them innocuous.

In a short paragraph upon artistic half-tones in phototypes the *Archiv* says that when Mr. Woodbury was lately at Düsseldorf he showed a number of proofs the half-tones of which were obtained in the printing-press. This half-tone—or, rather, simulated half-tone—was got in copying the collodion or mica photograph, by placing a mask between the negative and the sensitive gelatine film. The same plan was adopted some years ago in Düsseldorf, by Herr Georg Fuss, of Buenos Ayres, for the half-tones, not of phototypes, but of photolithographs.

The same journal recommends placing a sheet of plain glass having an etched border in front of carbon transparencies used for window decoration. The plain glass is intended to serve as a protection to the transparency, and, as fancy borders are becoming popular, it is found much easier to etch them upon the separate blank plate, which is thus made both useful and ornamental, than upon that bearing the picture. With regard to these borders in particular, and to ornamental glass in general, it seems that the old favourite, engraved glass and crystal, is destined to find a formidable rival in mechanically-etched glass. For instance: in Jacobsen's *Industrieblättern* Herr E. Siegwart says:—"Now that fluoric acid and the various preparations of fluor spar can be supplied so cheaply the decoration of glass by means of these preparations is fast gaining ground. Etched glass is already frequently to be met with, and there are signs of a coming brisk competition between glass etching and glass engraving, in which the latter will have enough to do to hold its own, as, in many cases, etched glass is really prettier than the engraved. The cost of production is also much less, and, since M. Hock, chemist, of Vienna, has published his work upon *The Mechanical Etching of Glass*, the difficulties which have hitherto prevented the application of the process to the wholesale production of glass etchings have been reduced."

"It is usually known that dilute fluoric acid is generally employed for etching in blank, and various preparations of fluor spar for frosted etching. The most beautiful effects are got by frosting the parts separately with fluoric-ammonium which has been slightly acidified by acetic acid. It must not, however, be supposed that all kinds of glass are equally suitable for frosting; a great deal depends upon the composition of the glass—that containing lead, for example, takes on the frosting easily and beautifully. If a surface with an icy glitter, and not a dead surface, be wished, it can easily be obtained thus:—Place the sheet of glass in a perfectly horizontal position, and cover it with a layer of very fine small shot, then pour very diluted fluoric acid over the whole. The acid eats out beneath the globules, and the glass stands out in little points between." Herr Siegwart also gives directions for producing an effect similar to that of an engraved photograph by simple means. He gets a negative picture upon a film of gum, sensitised with bichromate of potassium, and dusts red lead into its hollows. The red negative so obtained is then fixed and burnt in, after which the easily-dissolved lead-glass so formed is treated with strong nitric acid, the result being a white, frosted drawing, which on being viewed by transmitted light is seen to be a positive picture.

Several experiments have lately been made at Trieste to ascertain the distance at which coloured lights can penetrate in the dark. This was done with six lanterns of carefully-selected coloured glass, and having flames of the same brilliancy, placed on the beach. A party proceeded seawards, and at the distance of a mile and a-half the light blue lantern was invisible, and the dark blue nearly so. The white light was seen at the greatest distance, the red at the second, and the green at the third, but, in the opinion of the experimenters, the green light looked blue at a short distance, and is very apt to be taken for such, and for this reason those who made the experiments suggest that, in signalling, a green light should never be used except in conjunction with white and red lights.

THE SCENERY OF THE BLUE MOUNTAINS, N.S.W.*

The next morning we proceeded about two miles farther, to where the camera was at work, passing several points cleared and marked for taking. Here we found many admirable points of view, for the stream is wider and clearer of brush, and rushes over rocks, with quiet pools here and there, giving nice foregrounds, while a movement of a few yards changes the distance, the crags being in profile. Indeed, this is the only kind of landscape to be obtained here, looking up or down the stream, as the gorge is so narrow. Here numberless pictures might be taken, and amongst so much wealth it was difficult to make a selection. We soon set to work—the artists with their pencils and brushes, while Mr. Lindt and myself assisted Mr. Bischkoff in exposing a few 15 × 12 plates, till the sun got too hot and too high. It was certainly working wet plates under great difficulties.

In the evening some of us strolled down to the lower camp, about five miles from the first. The Grose Gorge is here joined by that of Govett's Leap Creek, which extends at right angles for four or five miles. At the confluence of the two streams the valley widens out, and there are a few hundred yards of flat ground covered with great gum trees some 150 or 200 feet high The camp is nearly 1,400 feet below the railway, being only 1,050 feet above sea level. It is situated immediately under Mount King George, which towers above it some 2,500 feet—1,400 feet being sheer precipice—and all around are glorious views of great crags and walls. I was sorry Mr. Lindt had not accompanied us here; he thought he had seen enough and had returned.

Next morning we made an early start to get to the foot of Govett's Leap. The distance is not more than five miles; but the exertion must be measured by time, and not by distance. There was a heavy fog, but we trusted it would clear off by eleven, by which time we expected to reach our destination; in the meantime we rejoiced in the prospect of a cool scramble. For the first hour we had tolerably easy travelling, the valley being somewhat level and open. Then began some severer work, as the valley narrowed into a deep gully and the dense brush closed in. Through this we had to make our way, sometimes obtaining open walking between the trees which supported the thick roof of foliage, but oftener finding the surface a tangled mass of creepers, one of which in particular, called the "lawyer," was very obstructive; it is as thin as cord and as rough, covered with sharp hooks, which rasp and tear both garment and skin whenever they catch hold, which is not infrequent, as the creeper is almost invisible. Sometimes we had to climb along the slopes over fallen timber and steep rocks. Sometimes we had to take to the bed of the creek and join the stream in leaping from rock to rock—warily though, on account of the slimy moss that covered them. Once our guide slipped and got a severe fall. Meantime the fog increased, and every tree we caught hold of sent down a heavy shower of rain-drops, soon saturating us to the skin.

However, there was much to admire as we forced our way along—the foliage of the brush, glossy green, so different from the usual dingy forest hue; the broad leaves of the nettle tree, a foot in diameter; the tree-fern, spreading its palm-like crown, sometimes twenty feet overhead; and a great variety of ferns, conspicuous amongst them a climbing one, which wound its cords up the trees for thirty feet, from which feathery fronds sprang laterally, making most graceful wreaths.

An hour's hard work brought us to a fine cascade, called the "Trinity Falls," consisting of three leaps, framed in with beautiful brush foliage and tree-ferns; it would make a fine subject for a short-focus lens. Here

* Concluded from page 309.

Mr. Piguenit, a Tasmanian artist who had been a month in the valley, spent several days sketching in water-colours.

We were now at the foot of the steep slope which leads up to the cliffs at the head of the gorge, over which the two falls leap; we determined to follow the right-hand stream, and a tough climb we had of an hour and a-half—impeded as we were by the tangled brush, fallen timber, and precipitous rocks—when we safely arrived at the foot of the Horseshoe Fall. But, alas! the fog now filled the whole valley, and we could not even see the top of the leap, 600 feet above us, so dense was it. Now and then, through the drifts, we could just get a glimpse of the cliffs on either side, and I noted some points from which the falls could be photographed should they prove accessible.

After getting rid of our scanty provisions we determined upon visiting the foot of Govett's Leap, none of the previous parties having reached both falls in the one day; but as we were now at the level, and it was not more than half-a-mile off, we thought we might get to the Leap by skirting along the foot of the cliffs. This we did for some distance, till we found it too difficult from the quantity of fallen rocks and the thickness of the brush; so we had to descend some distance to the stream and repeat our climb up its course. This we found more arduous than the first, but we at last reached the basin at the foot of the fall; and, though we could not see much, we enjoyed what we did see. I have already mentioned that the clear leap is 520 feet, and with the slight breeze the thin column of water swayed backwards and forwards several yards. Instead of falling in an unbroken stream, it divided into jets and knots and spray, just like the stars and serpents from a rocket.

We were too cold in our saturated state to remain at rest long; so, after carving initials on the trees and adding to the records in a primitive "letter box," we began the descent—which was at first as difficult as the climbing, from the danger of slipping and rolling down the steep inclines—and reached the camp in the evening tired but happy. During the night the fog turned into heavy rain, and as the tent was not altogether waterproof some of our party received an unwelcome bath; but the morning was beautifully fine and clear, and we determined to explore the cliffs in the neighbourhoood to try if we could not find a way out of the valley, and so save the tramp of fifteen miles up the gorge. After carefully scanning the cliffs with an opera-glass, we selected the point of attack, and rather more than an hour's hard climbing through brushwood and "lawyers," brought us to the foot of the precipice. By this time some of the party had had enough of it, but three of us persevered and to our great gratification succeeded in finding a way easy beyond our expectations up a crevice in the rock. After half-an-hour's scramble we were on the top; and making our way through thick scrub for half-a-mile, "blazing" our track as we went along, we came to a cleared road leading to Blackheath, four miles off. The view from this place is magnificent. We stand at the junction of the two gorges, looking down at their vast depths on the right and on the left, their silvery streams gleaming far below, shut in on the opposite side by mighty walls down which, here and there, bright threads of waterfalls were leaping; in front King George, Hay, and Tomah mounts rise precipitously, and beyond them lies spread out the flat country to the coast, at least fifty miles off. I fancied I could make out Sydney, but could not be sure, as, notwithstanding the clearness of the atmosphere, there was haze in the far distance. Behind us a train, like a tiny black caterpillar, was crawling along the Darling Causeway.

After quenching our thirst with the native currant—the juice of which tastes like a saturated solution of citric acid, and of which we afterwards made some delicious "lemonade"—we descended to the valley again, well pleased with our discovery, which will in future make the distance for pedestrians five instead of fifteen miles—four of them a good road for vehicles.

In the afternoon I climbed a hill on the opposite side to view our course, and from this point one could form a good idea of the great height of the valley walls, over 2,000 feet, with less than a mile base line. The great white gum trees below, though 200 feet high, looked mere pipe stems.

The next morning four of us started homewards by the new track, two others accompanying us to learn the route. On reaching the top some of us resolved to strike across country and attempt to make Mount Victoria station, five or six miles off, having lunch and bottled ale in view. One, however, wisely as it turned out, refused to leave the cleared road to Blackheath, and went on his way alone. The country we had to cross, besides being thickly covered with scrub, is very much cut up with gullies, and after safely crossing the first, we were entirely blocked by the second, ravine The water had cut down through the rock some 200 feet, and as the cliffs were overhanging it was impossible to get down them; and after an hour's hard scrambling trying to head the gully we had to give up the attempt and the prospect of ale, and return to the Blackheath road. We soon sighted our late companion, sauntering leisurely along, and "cooeyed" to him, but, to our surprise, instead of stopping he quickened his pace. We put on steam, shouting in vain, as he still hurried on, and at last leaving the road began to climb a rocky hill. When we overtook him, we found to our great amusement that he had been pursuing the *echo* of our "cooeys."

We reached Blackheath at noon, just in time to escape a heavy shower; and here we met a landscape photographer, Mr. Brodie, and his assistant, on their way to operate at the top of Govett's Leap. In a couple of hours our train came up, and by six o'clock we were again in Sydney, having much enjoyed our four days' excursion.

Besides the amateurs Mr. Piguenit has made about twenty sketches, which he will reproduce in oils; Mr. Carse, also an oil painter, two or three; and Mr. Bischoff has obtained between thirty and forty large negatives. I hope to send some prints on a future occasion, but I cannot get them until those for the Philadelphia exhibition are completed. I am afraid they will not be very satisfactory as works of art, as, in addition to the difficulties under which they were taken and the impossibility of waiting for proper effects of light and shade, Mr. Bischoff was considerably under-exposing them, in fear of losing detail in the distances. Mr. Lindt and I persuaded him to give a few three times his usual exposure, with greatly improved results. However, they will give an idea of the nature of the scenery and, perhaps, invite others to endeavour to improve upon them. E. B. Docker, M.A.

A SHORT TRIP ON THE THAMES.

[A communication to the Liverpool Amateur Photographic Association.]

Having lately made a short trip with some friends on the Thames I think it might interest the members if I were to make a few remarks on its scenery as adapted for the camera.

The weather on our starting from Reading was anything but promising, as we were detained there for an hour and a-half by heavy rain; but on its clearing up we started, and, fortunately, the rain held off, and I made up for deficiency of light by long exposures. During the first two days there was hardly a breath of wind; this was fortunate, as foliage makes up the bulk of the scenery.

My experience only extends to the views as seen from the river itself, for I never left its banks. Having some fifty odd miles to row in two and a-quarter days we had no time to make further explorations.

An island near Shiplake was the first view to attract my attention, on which I exposed my first plate for three and a-quarter minutes ($\frac{f}{34}$); with what result you can see, as I lay a print from it before you.

Wargrave gives several good subjects, but about "Park Place," a little above Henley, it is particularly fine. The landing-place or boat-house there makes a very good picture. It was getting late (6.30 p.m.) when I was there, so that I only secured one view at this part of the river. On arriving at Henley I exposed a plate at 7.30 p.m. on the view from the hotel window for twelve minutes ($\frac{f}{34}$), and I think you will consider it was moderately successful considering the lateness of the hour.

The next day we passed through by far the finest scenery on our trip. Near Culham Court, amongst the islands, there are some charming scenes. Unfortunately, the only plate I exposed here was under-exposed.

Medmenham Abbey, Hurley Weir, and Bisham Abbey all make good subjects, but at Cookham Lock and Cliefden Woods are to be found the gems of this part of the river. A rustic thatched cottage on the bank of the river, backed up by the Cliefden Woods, is a beautiful subject for the camera, and I was most fortunate in obtaining a capital negative of it.

Windsor Castle and Eton afford many suitable views, but being pressed for time I only secured one negative of each. Below Windsor the scenery is not nearly so interesting, but, doubtless, my adverse opinion was caused by the lovely country we had passed through on the previous day above Windsor.

In the three days I exposed twenty-two plates, all of which were successful with the exception already named. They are all taken on plates I prepared, before leaving home, with the "Liverpool" emulsion, and were not developed until my return, about a fortnight elapsing between exposure and development. Altogether we had a most enjoyable trip, and I can strongly recommend it to anyone who is in want of a good "hunting ground" for photographic purposes.

W. Horseman Kirkby.

SOME FURTHER REMARKS UPON DOUBLE SALTS OF CADMIUM AND THE IODISING OF COLLODION.*

Perhaps some of you would like me to give more exactly the quantities used in the preparation of "double salt collodion," as used with the best results for a long time back by Captain V. Tóth and myself, though by means of the table already given other iodising salts from the double salts can easily be calculated. We employ a collodion based upon Vogel's experiments as to the best proportion of bromine to iodine (one atom : five atoms).

Double Salt Collodion.—2·8 grammes of twofold ammoniac-cadmic iodide and 0·4 grammes of single ammoniac-cadmic bromide is dissolved in fifty cubic centimetres of absolute alcohol; the solution proceeds very quickly and easily (seven parts by weight of the iodine double salt and one of the bromine double salt correspond very nearly to the proportion of five atoms of iodine to one of bromine). One volume is mixed with three volumes of raw collodion, thoroughly shaken, and after standing from twelve to twenty-four hours it is ready for use.

* Concluded from page 298.

The collodion becomes more or less yellow according to the quality of the cotton; this colour does not increase with long keeping. It (the collodion) keeps for years, gives very beautiful negatives, and is, besides, worthy of recommendation if one do not bring the question of sensibility into competition with durability. I might maintain that the sensitiveness is not to be too meanly estimated, that the collodion is far more sensitive than one iodised only with cadmium salts, and that it is not thick like the latter, but does not differ in consistency from the raw collodion. It is especially adapted for reproductions, but is also good for portraits, and many portrait collodions in common use are no more sensitive than it is. Landscape collodions are best prepared with these double salts, but, naturally, the proportion of bromine is increased.

As an example of a superior collodion containing free ammoniac iodide in addition to the double salts I cite the *mixed double salt collodion.** In respect to the bromine and iodine contents it is almost identical with the foregoing. In fifty cubic centimetres of absolute alcohol 2·8 grammes of twofold ammoniac-cadmic iodide and 0·3 grammes of ammoniac bromide are dissolved, and one volume of the filtered fluid is mixed with three volumes of two-per-cent. raw collodion. In this collodion the maximum of sensitiveness is attained, in so far as it depends upon the quality of the iodising salt, and is influenced by the proportion of the ammonium to the cadmium salts. This collodion is especially adapted for portrait work; it is, however, less durable than the former collodion, but, notwithstanding, it can be kept for many months. I fear I should fall into repetitions if I were to describe here the properties of the variously-salted collodions in their differences from those already spoken of.

In the course of my experiments with the iodising of collodion the question occurred to me whether the maximum limit of the bromine and iodine addition to the collodion is not influenced by the nature of the iodising salt, or whether, given a due quantity of the said iodine and bromine, it is not indifferent in combination with which metal they are introduced.

Experiments were then made with one-and-a-half-per-cent. celloid collodion; that is, with prepared salted collodion containing one and a-half per cent. of cotton. For the preparation of all the following tests collodion was made by mixing two-per-cent. collodion with one-third volume of absolute alcohol in which the iodine and bromine salts were dissolved, which contained to one and a-half per cent. of cotton a mixture of twofold ammoniac-cadmic iodide and single ammoniac-cadmic bromide in the proportion of one atom of bromide to five atoms of iodine:—

I. 1·3 % — 1·5 % — 1·7 % — 1·9 % — 2·0 % ammonium double salts.

Similar trials were made with the corresponding sodic-cadmic double salts (one atom of bromine to five of iodine), which contained—

II. 2·0 % — 2·2 % — 2·4 % sodic double salts.

The potassic double salts could not be verified on account of the unfavourable durability of the bromine compounds. In order the better to compare the results I iodised also some specimens of collodion with cadmium salts only (one atom of bromine to five of iodine) in the following proportions:—

III. 2·0 % — 2·2 % — 2·4 % cadmium salts.

The comparative examination of the collodion (silver bath 1 : 10) showed that the maximum limit of iodising with the said salts is—

In the case of the ammoniac double salts ... 2·0 per cent.;
,, sodic double salts .... 2·5 ,,
,, cadmic salts .... 2·2 ,,

that is, that collodions with the said percentage of salts and one and a-half per cent. of cotton are the most strongly-iodised collodions possible which yet give good films after silvering. Collodions with the next degree higher of salt contents than the series examined above show streakiness, &c., on being silvered, and soon show symptoms of over-iodising. Collodions poorer in salts give very beautiful but thin films.

In considering these maximum numbers it will be found that they represent almost the same bromine and iodine contents, and it may, therefore, be assumed that the quality (composition?) of the bromine and iodine salts have no influence on the maximum limit of the salting of the collodion (supposing the salts are soluble in sufficient quantity), but that it depends solely on the quantity of bromine or iodine present.

If a strongly-iodised and, at the same time, hard and densely-working collodion be desired it is as well not to use more salt than is prescribed in the following formula:—Dissolve 3·4 grammes ammoniac-cadmic iodide and 0·5 grammes ammoniac-cadmic bromide in fifty cubic centimetres of alcohol, and mix one volume thereof with three volumes of two-per-cent raw collodion. This collodion is quite far enough removed from the maximum degree of iodising; a collodion equally strongly-iodised with cadmium salts is even unpleasantly thick.

By means of these detailed examples I wish to illustrate the use of the double salts, and I believe that by fixing a rational maximum point for the iodising of collodion we are on the way to the solution of the question.

In conclusion: I may mention that Captain Tóth has taken a great number of very successful portraits and reproductions with the double salt collodions, which set at rest any doubts as to the value of the latter.

In view of all the circumstances just related there seems to be good grounds for supposing that the ammoniac-cadmic double salts will soon come into use.

Dr. Josef Maria Eder.

* Almost all collodions produced with cadmium and ammonium double salts contain excess of ammoniac iodine.

Contemporary Press.

HOW TO MAKE AND USE A SMALL BATH.

[Philadelphia Photographer.]

Photographers who have large galleries and do large work must of necessity use large baths. Those who have galleries in small towns, or travelling saloons, have seldom occasion to use larger than to take a 4-4 or 8 × 10 plate. There are some things to be said in favour of a small bath in preference to a large one. It is, first, much less expensive; then it is much easier to handle and less liable to waste. Where one does his own operating, and has sufficient experience and knowledge of his chemicals to keep them in working order, he should be able to work as successfully with a bath of half-a-gallon as with one four or six times as large. The bath should be made up right at first, then "left severely alone."

Pure silver and distilled water will make a bath which will not require sunning or boiling; but as this water is frequently not at hand, good, soft spring water, or from a piece of ice, or river water, will do. Put one or two ounces of silver into a quantity of water sufficient to fill your bath-holder, with a little excess; place it in the sun for six or eight hours, or, what is just as well, place it over the fire in the evaporating-dish, and bring it to a boiling heat. Either method will throw down all impurities in the water. Filter, and add silver to make it up to forty grains to the ounce of water by the testing tube, which every one should have—not more than forty grains strong, as much trouble often meets you at once when made stronger.

Coat a large glass plate on both sides with collodion, and let it remain in the bath over night. Filter the bath again, and try a plate; if it work clear and clean add no acid. If a little foggy add two drops of C. P. nitric acid to fifty ounces of solution. Now, after using a few plates, it will work all right, and should not be altered for weeks, unless it be to add more of the same solution of which the bath was made.

If you work with care, with clean plates and clean fingers, the bath will not need filtering oftener than once a week, or once in two weeks, according to use. It is a positive evil to be filtering the bath every day. When by use the bath works oily by excess of alcohol and ether, but well otherwise, add a little alcohol to the developer, and use the bath as long as possible. When it fails to make good negatives pour it into the evaporating-dish, add eight ounces of water, and place it over the fire; when it gets to boiling heat add a few drops of a solution of bicarbonate of soda. This will neutralise the acid and precipitate the excess of iodide of silver.

Boil down the bath to the same quantity of solution as before adding the water. When cool, filter and test it. Make it forty grains strong, and, if alkaline by litmus-paper, add two drops of acid, or more, so as to leave it slightly acid.

It now should work as well as when new, and can be used with a good collodion until it is reduced to nearly thirty grains. After it has been renewed and boiled down the second time and gives out it should be discarded for negatives, and can be often used for ferrotypes and for redeveloping purposes. By this method the bath can be utilised to such a degree that there need be but little waste.

Remarks.

Glass is the most reliable for a bath-holder. If it cost a little more at first it is cheapest in the end.

By having two baths much trouble is avoided.

By using a few drops of water in the collodion you will never be troubled with pinholes.

An excess of water, or bad cotton, will make the collodion work in crapy lines.

Much trouble often arises from a bad sample of cotton.

When things work badly the bath should not be condemned at once. Work more carefully. See that the plate is clean. Let the collodion set on the plate well before dipping.

In cold weather the plate will develope woolly, with metallic silver over it. By warming the bath the trouble vanishes. The bath should be kept warm in cold weather. By doctoring the bath frequently with this, that, and the other nostrum, which is often recommended, you will have plenty of trouble and annoyance.

Ferrotype plates should not be dipped in the negative bath.

Baths for ferrotypes should be made and treated the same as for negative use, but can be used with less silver.

W. Snell.

ART AND MECHANISM.

[Photographic Mosaics.]

Many years ago, when the writer was a novice in the photographic profession, his gallery was visited by a *dilettante* whose remarks opened his eyes for the first time to a most persistent antagonism A jealous. adherent of the old family of art, she could not conceal a certain disdain for the claims of the new relative—photography. Passing from painting to painting, she would stop occasionally before one that interested her and ask, with the air of a person ready to stifle all admiration should her suspicions be realised—"And is this a *machine picture*, too?" It was not that she criticised unfavourably the appearance of the work, but the method of its production; not reproaching the result of our labour, but the aid we had received in its performance. So one who, with toilsome climbing, has earned his long-sought view from the summit of Mount Washington might regard with infinite disgust the ease with which the brisk comer by railroad train steps out of his comfortable car to enjoy the selfsame prospect. Now, it is admitted that, if his premisses were always sound, your carping *virtuoso* would not be wrong in his estimate of photography. If, in truth, the photographer with his camera and chemicals could be justly compared to the old profile-cutter with his pantograph, or the life-cast maker with his mould and plaster, photography might be very beautiful and useful, but would be as devoid of art as the most inveterate *dilettante* would care to assert.

We do not deny that "machine pictures" *could* be made by photography. The subject might be taken in any mood, seated in any chance position, with any chance lighting, with the simple mechanical direction to "keep perfectly still," and the result would be a genuine mechanical picture. Every one can see that such a picture would be well defined by such a name; but in describing its production have we not actually shown what is *not* done in any good photographic establishment?

From the moment an applicant for a picture enters the photographic artist begins to study the points to be made in the sitting—what agreeable features to be made much of, and how; what less pleasing ones to be subordinated, and how; what expression—elicited unconsciously—would seem to reveal the inner being of the individual in its better aspects to partial friends, and how to evoke it* *naturally* at the right time; what carriage most befits the figure and temperament of the person before him; or would make the best compromise, supposing these to be harmonious. Such considerations wear into the very being of every skilful photographer, and are crowding his mind while the applicant for his care is all unconscious of the cost of it, and "only wishes he would hurry and get done!"

It is insisted that such considerations, all essential to the practice of meritorious photography, have their root and growth in what is the very antipodes of machinery—sympathy, which is the essence of art. A distinguishing characteristic of machinery is inexorableness, but art is all feeling. Art *is* feeling addressed to the ear or the eye.

In addition to the studies already named, the artist-photographer, if he be about to make a figure picture, especially of a lady, has to be concerned not only with the pose but with all the requirements of art in the arrangement of the drapery and accessories. His machinery, most assuredly, will not do this for him. Then nothing has been said of the lighting of the subject. None know better than the judicious photographer how much, not merely of beauty in effect, but of actual likeness, depends on the disposition and due relation of light and shade. The machinery of the skylight, used to bring about these effects, occupies precisely the same position in art with the photographer as with the independent artist; only in the case of the former the lighting appliances are usually more complete and more readily controlled.

So far we have been considering only unfinished photography. The negative, when made, must pass under the hands of an artist for the correction of defects and exaggerations, and any but a skilled artist will surely spoil it. After the result is placed on paper or other material the work of the pencil must be resumed, and the style and degree of merit the picture is to have, when completed, depend on artistic and not in the least on mechanical skill.

But, although the old-school connoisseur may never have concerned himself about such a formulation of art methods being applicable to photography, he may, nevertheless, be an admirer of our work "in its place." We would deal justly with his justice, so far as it goes. Do we not know that he treasures with supremest gratitude more than one dear image which, without the photographer's skill, would have depended for its recal upon wayward memory? Our concern is that a full recognition of photography as a legitimate adjunct of high art is denied on the assumption that imitative art is under some kind of obligation to discard every aid to bear ocular appreciation of what is to be represented. Now let us be candid with one another. The acknowledged artist, when he has an enlargement or a diminution to make, does not scruple to line over both canvases with proportionate squares, which look dreadfully mechanical and, still worse, mathematical. A more decided employment of mechanism is resorted to when the artist holds a strip of cardboard before the face of his subject and marks on it the places of the chin, the lips, the base of the nose, the roots of the hair, and the top of the head. If he fail to do this he risks his fidelity to nature—that is all. When the artist is well up with the times, and makes true likenesses, he takes his subject to a photographic gallery and gets two or more views of the individual to study while he shall paint. In other words, he acts like a sensible, practical man, and takes every means to saturate his conceptions, so to speak, with the features of his subject as they must be represented on a flat surface.

"This may all be true," our critic says, "but so long as the artist's freedom is not destroyed he is a true artist, all the same." Exactly; that is just the point we would come to. No one knows so well as an educated photographic artist that in the production of a likeness the photograph cannot be followed slavishly. In retouching a negative and in painting over a photograph the artists we are speaking of see before them, not what *is*, but what is meant to be. Often the constraints of the sitter's expression need correction. Beyond this the lines in the forehead, under the eyes and around the mouth, together with other shades in various parts of the face, often convey an entirely wrong idea of feature or expression. To create the true impression by altering, modifying, or removing any of these is the province of art, and no good photograph can be completed without this pencilling.

While it is allowed, then, that the photographic artist accepts valuable aid in the work of painting, we insist that it is in the direction of that close following of nature which has bestowed upon sculpture and painting the designation of "imitative art," and not in any wise of necessity tending to the destruction of freedom.

Having incidentally opened the question of "freedom," we cannot forbear asking if our critics do not know how heavily the bondage of the schools or of individual mannerism presses upon many a distinguished artist. As examples: one marine painter is noted for giving all his seawater the aspect of soap-suds. A very popular landscape artist invariably covers his sky, earth, and water with little pats of paint of about one size, standing for cloud flecks, foliage, ripples, and what not. How often do we hear among connoisseurs of portraiture such expressions as these:—"That looks like one of Spiller's hands." "Here is a Spoker. What clear, fresh complexion he always gave his subjects." "This is said to be a real Sir So and So; it's his mouth, certainly." Dear reader, what would be thought of a photographer who confined himself to one mouth; or, rather, what would be thought of a photographer who had not as many mouths as he had subjects? Then tell us whether all the mechanism in art is confined to camera boxes and chemicals!

Regarded candidly, is not photography, when under the control of art, to be accepted as belonging fairly to the province of legitimate manipulation? Is not our method the mere extension of a received idea? No less an instructor than J. Edwards, M.A., after suggesting acknowledged "mechanical processes," concludes by saying what, if we mistake not, was also said substantially by a much older authority:—"When a proper effect can be produced few will question the means by which that effect has been obtained." One of these "mechanical processes" (we almost tremble for the dignity of high art as we write it) consists in the use of so unrefined a machine as a "tooth-comb."

If, as we trust will one day be generally conceded, the most intimate use of photography in the hands of a genuine artist does not interfere with his individuality, what shall be said in opposition to that use? Nothing that might not be urged against any improvement in accuracy and directness by those who fancy that the royalty of talent must hedge itself about with technicality and indirection.*

Some artists of acknowledged standing have seen the vast possibilities growing out of the right use of photography—as an aid and not as a dependence—and are fortifying their skill by what we must consider a worthy use of a valuable accessory. That more have not done so is not necessarily due to want of disposition. It is not easy, even for an independent nature, after, perhaps, a lifetime of successful work, to break through old habits by the adoption of new methods.†

As a gratifying sign of progress we point with pleasure to the kindly intentions shown by the management of the art department of the Centennial Exposition. We believe that nothing but absolute failure of space has prevented the placing of photography in close relation with the fine arts of the world. As it is, we have every reason to feel that the American Exposition will help forward an appreciation both of the progress and province of photography entirely in accord with the spirit of this article.

This generation will witness a breaking up of much of that exclusiveness which, while it does not hinder our happiness or self respect, still operates, with some, against that full grasp of the elevation of our pursuit which we would like all people of taste to share with us. As to ourselves, personal fidelity to the higher calls of our profession will do everything for its universal recognition among the noblest industries of the world.

W. Curtis Taylor.

* We are not standing up for bunglers, who may be found in every profession. A lady has mentioned to the writer that a friend, on applying to a photographer, who seemed very anxious to make an effective picture of her, was startled out of all naturalness by his abruptly saying—"Now, won't you please *run over your expressions* for me?"

* In one of Dean Swift's fancies he visits a people of such technical proclivities that, in a tailor's shop, he saw a man standing on a stool while the superfine artisan, in a far corner of the room, with quadrant and theodolite, was taking his measure for a coat

† A pleasant recollection of the late venerable Thomas Sully is connected with his assurance, given to the writer, that if he had been thirty years younger he would have connected himself with our "branch of art."

Our Editorial Table.

A MANUAL OF QUALITATIVE CHEMICAL ANALYSIS.
By WILLIAM DITTMAR,
Professor of Chemistry in Anderson's University, Glasgow.
Edinburgh: EDMONSTON AND DOUGLAS.

"CHEMICAL Analysis," says Professor Dittmar, "is a branch of applied chemistry." In the introduction to the above-named *Manual*, the author desires the student to understand that analysis is not an art which can be learned independently of chemistry itself. It is possible to be a fair theoretical chemist without being able to carry out an analysis; but, most assuredly, no one can be an analyst without being a scientific chemist.

This work is intended for the use of students who, after they have mastered the first rudiments of chemistry, enter a laboratory to work under the direction of a teacher, while, at the same time, they continue their study of theoretical chemistry. It is divided into four sections, the first of which is devoted to a series of exercises which will give an idea of analytical methods to the student who works his way through them, and thus obtains some familiarity with the operations involved in their execution. In the second section are described the properties of the most important metals, and the reactions they exhibit as such, or in one or other of their most frequently-occurring states of combination. From these reactions is deduced a method for the qualitative analysis of a mixture of metals, supposing them to be given in the shape of salts of certain acids. The third section treats of the non-metallic elements and their compounds, with particular regard to non-metallic acids. For each class of metalloid compounds it is shown how their metallic derivatives must be treated in order to bring the metals contained in them within the range of the methods given in the second section. In the fourth section the application of the methods described in the two sections immediately preceding is treated, and it is shown how far they are likely to be available in the investigation of a substance of an unknown nature.

The work is, undoubtedly, one of great value, and we can strongly recommend it to those of our readers who desire to become acquainted with the most recent methods of chemical analysis.

Meetings of Societies.

EDINBURGH PHOTOGRAPHIC SOCIETY.

A SPECIAL meeting of this Society was held in 5, St. Andrew-square, on the evening of Monday last, the 3rd inst., for the purpose of considering the fact that, in consequence of an equality of votes, the Council had found itself unable to carry out the wishes of the Society, as expressed at the special meeting held on the 27th June, to the effect that exhibitors resident in Edinburgh and members of the Society should not be entitled to compete at the forthcoming exhibition.

Dr. Thomson, the President, occupied the chair, and it was evident at the very commencement of the proceedings that the usual equanimity of the Society was very much disturbed, and that feeling on both sides ran very high.

As is usual in such cases, considerable delay was caused by certain members taking their stand on trivial points of form which at other times were not thought worthy of notice; but the ground was at last cleared, and the tug of war began by Mr. DOBBIE moving, seconded by Mr. ANNAN, that "that portion of the minutes of the previous special meeting, whereby exhibitors resident in Edinburgh and members of the Society be excluded from competition at the forthcoming exhibition, be not approved."

Mr. W. NEILSON followed with an amendment, seconded by Mr. ROSS, to the effect that the Council be directed to carry out the wishes of the Society, as expressed in the minutes of the special meeting.

A long, stormy, and, consequently, somewhat irregular discussion followed, in which Messrs. Ross, Kyles, Bashford, Asher, Annan, Tunney, Douglas, Turnbull, Williamson, Dr. Nicol, the President, and others took part, and on a vote being taken there voted for the amendment eleven, and for the motion twenty-four.

The meeting was then adjourned.

LIVERPOOL AMATEUR PHOTOGRAPHIC ASSOCIATION.

THE usual meeting of this Association was held on Thursday evening, the 29th ult., at the Free Public Library and Museum,—Mr. A. Tyrer, Vice-President, in the chair.

The minutes of the previous meeting were read and passed, and Mr. W. King was elected a member of the Association.

The Secretary (Mr. W. Murray) sent for inspection four views of picturesque scenery taken in the neighbourhood of Langholm, Dumfriesshire, which were examined with interest by the members.

Mr. W. Horseman Kirkby read a short account of his recent excursion on the Thames [see page 318], accompanying his paper with ten excellent prints from 8 × 5 negatives, taken during his journey. The plates were prepared with the Liverpool emulsion.

The meeting then assumed a conversational character, emulsion processes being the chief subject.

The meeting was shortly afterwards adjourned to Thursday, 28th September.

After the meeting a discussion took place on the subject of a short excursion on each Saturday afternoon, with a view to the members working together. It was suggested that those who wished to go out with the camera on Saturdays, in company with other members, should give notice to Mr. Weber, Grosvenor-buildings, Tithebarn-street, who has kindly undertaken to receive such notices, as well as to inform such as may call upon him what excursions have been proposed.

Correspondence.

ILLUSTRATIONS OF AUSTRALIAN SCENERY.—LINDT'S METHOD OF WORKING.—MAMMOTH PHOTOGRAPHS.—HOLTERMANN'S PANORAMIC VIEWS OF AUSTRALIA.

IN the account of my excursion amongst the Blue Mountains I promised to send some of the photographs taken by Mr. Bischoff for the Sydney Academy of Art. I now forward a few—not as specimens of artistic photography, but to give some idea of the kind of scenery to be met with.

The first three have been taken in the bed of the Grose, looking west; but as the light was not in a good direction they do not do justice to the lofty cliffs in the distance. The three next are all taken from the same spot, at the junction of the Grose and Govett's Leap Creek—No. 4 looking north-east, down the valley, and showing on the left part of Mount King George. No. 5, looking west, gives the point of crag at the junction of the two gorges, and up which my party discovered a practicable track to the railway. This photograph is under-exposed, and there is an absence of detail in the foreground, while the distance is brought too near. No. 6, looking south up the gorge of Govett's Leap, shows the cliffs on the eastern side. No. 7 is a repetition of No. 4, with a wider angle; and No. 8 is taken a short distance up the creek, giving the camp in the foreground, and the perpendicular wall of Mount King George in the distance, looking north.

I also send, in illustration of the same locality, some smaller views by Mr. A. Brodie, whom I met going there as I returned from my trip. Three are taken from the top of the cliffs at Govett's Leap. No. 1 is the scene which breaks on the spectator as he approaches the head of the gorge, looking north; but it only gives a faint idea of the grandeur of the view, which almost takes away one's breath at first sight—the wonderful blue atmosphere giving such vastness to the depth, which is lost in the photograph. No. 2 is taken from the spot where the stream leaps over the precipice; and No. 3 shows the leap itself—a clear fall of over 500 feet. The other three are taken at the weatherboard, or Regent's Falls. No. 4 is a preliminary cascade; No. 5 the upper part of the fall itself; and No. 6 gives some idea of the brush scenery in the gully.

These photographs are fair specimens of the prints to be obtained in the shops here, and they command a ready sale at a guinea a dozen, or two shillings each. Another landscape photographer, Mr. Paine, has also produced a large series of about equal merit.

Some years ago I mentioned that the Sydney artists were superior to the Melbourne ones in portraiture, but inferior in landscape work. We still keep the lead in the former branch, and now, I think, we are quite equal to them, if we do not surpass them, in the latter. To justify my opinion I forward some views taken in the Dandenong Ranges, near Melbourne, which I selected last year as the best photographs I could see for sale in the shops there.

But the best landscape photographs I have seen produced in these colonies are by a country artist, Mr. J. W. Lindt, of Grafton, whom I mentioned as accompanying me to the Valley of the Grose. He is a very enthusiastic photographer, always aiming at improving on his work, and taking the greatest pains over every individual print he issues. He first came into notice through the production of a fine series of portraits of aborigines, which will probably prove of great

value in ethnological investigations. The trouble he took over the accessories is remarkable, and the results very happy, as they illustrate in a great measure the mode of life of the natives, who are now fast disappearing. The accessories were built up in his studio of natural materials—the camp, the bark gunyah, appropriate shrubs and foliage, aboriginal utensils and weapons, &c. In one picture a hunter is bringing a dead kangaroo in triumph to the camp; in another a huge snake enlivens the foreground. He has since produced a series of what may be called *genre* pictures, illustrative of bush life, which are carefully executed and very interesting.

The mounted landscapes I send as specimens of Mr. Lindt's work are part of a series taken during a few weeks' trip on the Newton-Boyd road. Grafton is situated on the Clarence, the largest of our eastern rivers, which, with its tributaries, takes its rise in the high table-land called "New England." The Newton-Boyd road connects the table-land with Grafton, and runs through some most picturesque and varied scenery. First, through a park-like country of trap formation, and hills and plains beautifully grassed and watered; then through a granite formation, rapidly descending by a winding road to lower country, each turn in the pass displaying a fresh view of ravine and crag. After crossing several streams the road descends to the valley of the Little River—a tributary of the Clarence, which latter is a rapid stream running in a winding gorge amidst high mountains. The country here is of a different formation again—slate, I think. Though there are no cliffs, as in the Blue Mountains, the steep slopes come quite down to the stream, and for many miles in succession the road is cut out of the rock, following the windings of the river just above flood level, the road forming a narrow track barely wide enough for two vehicles to pass, with a wall of rock on one side and an unfenced precipice on the other. In one place the road passes through a tunnel, where a perpendicular spur comes down to the water's edge. Here and there the valley opens a little, giving space for a small settlement or a mining village. The steep ridges and ravines are in places clothed with dense brush, the trees twined with the convolvulus and other creepers, while graceful pines tower here and there.

The road follows the Little River to its junction with the Nymboida—a larger stream—which it crosses by a fine iron bridge, and then climbs the ranges again, afterwards descending to a sandstone country, through which runs the Urara River, another tributary of the Clarence, and which is also spanned by an iron bridge. Finally: the road comes down to the low alluvial flats of the Clarence, which were once covered with brush, consisting of beautiful tropical foliage and handsome trees, conspicuous amongst them being the gigantic fig-tree; but now the brush has in great part disappeared, to make room for fields of sugar-cane and Indian maize, for which the soil and climate are admirably adapted.

Having given this sketch of the country, I need not describe the photographs in details, but a few remarks about Mr. Lindt's method of working may be useful. His negatives get a full exposure, and are kept very thin, so that careful management is required in the printing. After carefully selecting his paper from each albumenised sheet he first prints his cloud negative. I was amused at watching him, while his hands were occupied in graduating the horizon line, shading part of the sky, where a tree was to come, with his hat, and moving his head to prevent a sharp line. The landscape negative is then placed in the pressure-frame, the paper with the printed sky properly adjusted, and a brown paper mask for the sky, roughly torn to shape, pinned to the front of the frame. Then a sheet of parchment is tacked over the whole front. By this means, though printing in the sun, he gets a soft, subdued light, and the prints are very good as far as I can judge. He has a high opinion of his work, and will not sell his pictures for less than seven shillings and sixpence each—a price which limits their sale; but I think he is not wrong in setting up a high standard for himself, and a less price would not repay his trouble. I shall look forward to your opinion of them; and, perhaps, you may give others an opportunity of seeing them by showing them at some meetings of societies. I have but few opportunities of seeing high-class English work, and I should be very glad if you, or some of your friends, would send me in return for these some specimens of what are considered good photographs, especially from emulsion negatives.

I see you have extracted from the *Sydney Evening News* an article describing Mr. Holtermann's large photographs. Some years ago I wrote about his gigantic undertaking of photographing all the towns in the colonies and forming a travelling exhibition of them. The work was delayed through the sudden death of his photographer, Mr. Beaufoy Mestin, but has since been carried on with the assistance of Mr. Baylis. I had intended to report further progress, but my absence from Sydney prevented me from seeing his work till the other day. I did not see the prints, as they have been sent off to the Philadelphia Exhibition, but I examined the negatives. They are certainly curiosities, and the difficulties encountered in taking them must have been enormous. The plate glass on which they are taken measures five feet by three feet two inches, and weighs over fifty pounds. About six pounds of collodion were used over each plate, and there were many failures, especially from the film washing off the plate; but the negatives eventually secured are very perfect—sharp up to the edges, as might be expected from a lens of nine or ten feet focus. They are full of detail (exposure four minutes), and signboards two and three miles off can easily be read, while the windows of a building six miles distant are distinguishable.

Mr. Holtermann has also taken a series of panoramic views with the same lens, but on plates twenty-two inches wide, including an angle of less than ten degrees, so the joinings are perfectly accurate. The lens was constructed in Germany to Mr. Holtermann's order, but I have not seen it, as Mr. Baylis is at present engaged in photographing Melbourne with the instrument. Mr. Holtermann has now a very large collection, having spent over £4,000 upon it. He leaves by the next mail, taking his negatives with him, and will exhibit them in England and on the continent. His enterprise onght to have a beneficial effect in dispelling many erroneous ideas concerning the colonies.

Sydney, April 15, 1876. E. B. Docker, M.A.

[Probably we shall next week give a critical notice of the views forwarded to us by Mr. Docker.—Eds.]

MEDALS AND EXHIBITIONS.

To the Editors.

Gentlemen,—I append the substance of some remarks I made at a special meeting of the Edinburgh Photographic Society. Some of the members have requested me to take this step in the hope of inducing other societies to consider the subject treated of. I was glad to read your statement in the Journal of the 30th June. It puts the question in its true light.—I am, yours, &c., W. Neilson.

Edinburgh, July 4, 1876.

As a medal is held to be the sign of superior excellence, it is self-evident that it cannot be justly applied to objects whose comparative excellence there is no mode of distinctly measuring. The proficiency of one among several schoolboys; the excellence of one among several machines; the colour of hair and bushiness of tail of one among several cats—all these can be distinctly measured, and therefore admit of a medal being infallibly bestowed on the best specimen. It is different with the fine arts. You cannot measure the excellence of a picture or piece of music with that distinct certainty which can be satisfactorily brought to bear on a cat's tail. There is no standard measure for fine art. The appeal lies solely to *taste*—the most uncertain of measures, differing more or less in every individual, and amounting, in practical effect, to a mere matter of opinion.

Artists are in general agreeable men; but they do not always agree about the merits of a picture—far from it. Suppose three or four artists were to say "this picture deserves the medal," and three or four other artists were to say "that picture deserves the medal," could the medal be held as a sign of superior excellence? No. In either case it would merely be an indication of the opinion of three or four men. By their practice of avoiding it artists show that they regard the medal system as an absurdity.

How it came to pass that photographers thought it becoming to rank their pictures with the mechanical arts by introducing the system of medals need not be discussed at present. Enough for us to know that medals should not *now* be given at an exhibition; and for this reason—the system *now* holds out a premium to dishonesty. In former times people sent photographs of their own production to exhibitions; and, whether they gained a medal or not, there was at least nothing dishonourable in the transaction. But new modes may introduce new customs. A selfish man now who wishes to gain a medal—either to gratify his vanity or to push his trade—may send his negatives, along with a few guineas, to a first-rate retoucher, and then send prints of the same to an exhibition as examples of his own work, although for two-thirds of what is exhibited he is indebted to the retoucher. And what would be the result? Just that he who might really be an inferior photographer—one who feels the need of gaining a medal—does, thanks to the retoucher, gain a medal; advertises that he has done so; and so acquires a fictitious prestige that enables him to push his trade. And this fictitious prestige amounts to a gross injustice to the other exhibitors, inasmuch as it will be held by the uninitiated that he who has gained the medal must be vastly superior to all others. What

exalts him unduly depreciates the others unduly. The injustice, in this manner, involved—in local competitions especially—demands grave consideration.

That the system of medals holds out a temptation to unscrupulous men to act in such a discreditable manner is sufficient reason that it should cease. Surely a society that has any self-respect should not patronise a system which may reward him most who most indulges in mean and dishonourable conduct.

The pet argument in favour of the medal system is that it induces persons who reside at a distance to send their photographs in the hope of gaining a medal. It must be admitted that the system appeals to the selfish part of our nature, and may produce some results in the way indicated; but to say that the generality of photographers require such a stimulus is to libel the profession. I am convinced that the influence of medals as regards the number of exhibitors has been greatly overrated. Human nature rejoices to exhibit what it can do, and perhaps what it cannot do, without the vague chance of getting a piece of bronze; and it should be remembered that there is one certainty regarding the medal system, namely, that some of our first artists will not send contributions to a competitive exhibition. The medal system gains us that loss at any rate.

There is a charity that begins at home, and sometimes ends there too; and it is possible that a man may be loudly philanthropic about benefit to distant people when all the time his eyes are firmly set in the opposite direction. Of course we photographers have more than the common honesty of mankind; but still it is possible that this cry of "distance" may, let us say occasionally, be used merely to lend enchantment to home views. In short, the old favourite argument has had its day, and is somewhat the worse for wear.

One of the chief benefits derived from such societies as ours is that they encourage an *esprit de corps*—a spirit of good-fellowship—among the members, the advantages arising from which are so evident that we need not dwell on them. Anything that tends to undo the spirit of amity in such societies is to be deprecated; and nothing tends more in that direction than to introduce competition among the members. The medal system is admirably calculated to introduce the very feelings which it is most desirable to exclude. There are societies which have already experienced the bitter curse of medals; and the warning they hold out should not be overlooked.

There have been far from indistinct indications—especially since the late London exhibition—that the medal system is falling into disrepute. It is still upheld, partly by the influence of interested parties, and partly because it has been the custom to uphold it; but none the less a feeling that it must cease is spreading widely. The photographic world just waits to hear the words fairly spoken; let us, as a beginning, have the boldness to say—"No medals!" The mechanical arts are worthy of all admiration, and cat-shows are not to be despised; but it is not our place to take rank with either of these. Let us assert ourselves, and take our stand upon the platform on which artists stand. In short, let us exhibit our pictures as the artists exhibit theirs, leaving the public to judge for themselves. The motto over all being—"*Honour and fair play.*" W. Neilson.

P.S.—At a meeting of the Edinburgh Photographic Society, held on the 21st June, it was resolved that the members of that society were not to compete for medals. The council declined to accept this resolution, and called a special meeting of the society, which was held on yesterday, the 3rd inst., when a well-drilled opposition reversed the resolution of the former meeting.—W. N.

CAPTAIN ABNEY'S PAPER.

To the Editors.

Gentlemen,—Will you kindly note the following corrections (which are necessary through printers' errors) that should be made in my last communication to you? Without them many of the sentences are absolute nonsense:—

Page 306, third line, third paragraph—*omit* "an emulsion of eosine with excess of silver." This sentence should have been in the fourth line, after "It was endeavoured to form." Twelfth line from the bottom of the same column—"colour film" should *read* "colour theory." At the end of the seventh line, after the word "for," should be a full stop; and in the next line the full stop should be omitted after "emulsion."

Page 307, first paragraph, seventh line, for "necessary" *read* "reversed;" second paragraph, third line, for "iodine" *read* "eosine;" third paragraph, fourth line, for "surpassed" *read* "impressed;" third paragraph, for "these plates" *read* "resin plates;" fourth paragraph, third line, for "as this is the least time in which I can obtain them" *read* "as C is the last line which I can obtain;" fourth paragraph, eighth line, for "A" *read* "a;" last paragraph, second line, for "mechanical" *read* "chemical."

I need scarcely say I had not seen a proof before a slip had been sent to your office.

Whilst writing allow me to say that, when exposing through the coloured glass, I purposely included in the picture a black board with squares of blue, red, and orange papers pasted on it. The blue gave no image, and could not be distinguished from the black board; whilst the red and yellow (the latter not being a monochrome) impressed themselves vigorously.

From what I can see in Mr. M. Carey Lea's article in your last issue, which appeared in the *American Journal of Science and Arts*, his views of the colour theory and my own are similar. I quite agree with that gentleman as to the necessity of employing coloured glasses in experiments on this subject, though I think that spectrum photographs should be obtained as well.—I am, yours, &c., W. de W. Abney.

July 3, 1876.

[It is due to our printer to say that Captain Abney's communication was received by him at the last moment, and in the form of a *printed* slip.—Eds.]

THE DRYING OF GELATINE PLATES.

To the Editors.

Gentlemen,—At page 287 of your Journal "Gelatino-Bromide" has asked me, among others, to give my method of drying gelatine plates. I can give no new method of drying the plates; in fact, I had my closet made on reading a paper by Mr. Palmer in a late Journal. My closet has a bottom of galvanised sheet iron, under which I place two spirit lamps, one near each end of the closet. Large air-holes are bored just above the iron bottom, and covered with orange tammy to keep out the dust. The top of the closet has a "trapped" opening to allow the heated air to escape. The closet is provided with levelled shelves, set in so that the air can rise and circulate between them; in fact, the shelves are not so wide as the inside of the closet. The closet is provided with folding doors. It is well to have a thermometer in the closet. I am afraid, though, that I can suggest nothing that "Gelatino-Bromide" does not know already.

Mr. King hopes that I shall not find fault with him for coming out with his note-book. How could I do so? But Mr. King says:—"My experiments were not conclusive, so I did not publish the results," &c. After the account he gives from his note-book of the experiment on which he placed no "real value," I wonder what he thinks of *my* experiments and suggestions. If his experiment did not seem to be sufficiently conclusive to form the subject of, at least, a hint to the readers of the Journal, what are mine? I must say that I think it a pity Mr. King did not publish his experience two years ago, as, so far as I am aware, gelatine workers did not know that it was *possible* to treat a gelatine emulsion like a collodion one—that is, with free silver nitrate.

I am inclined to think with Mr. King as to the peculiarity of the "rosy glow"—that it will appear in one plate and not in another, though the plates have been made together, and developed in the same way.

I am being much troubled just now with red and foggy plates. My "A" plates—the first I prepared with silver in excess—which gave, when I last wrote, such clear images, now fog badly, even with more restraining bromide in the developer; yet one plate out of the same batch yielded a fair negative. Again: I have a box of "C" plates, prepared at the beginning of last month (May), and of which I have said that they were more inclined to fog than the "A" plates. I have, today, opened the box, and find that the greater part show by transmitted light in the dark room a redness in the film—not all over, but nearly so, and generally in the middle rather than at the edges of the plates. Now is not this redness the incipient fog which makes its appearance on development? I am, however, as far from divining the cause of this abnormal action as ever, but I hope this state of things will not last long. It is evident that the action must be either spontaneous or brought about by deleterious fumes, which latter I do not believe to be the case.

But why is the action irregular? Why is the plate not uniformly effected? The Editors have propounded the question—Has silver bromide a mechanical or chemical action on the film of gelatine, as evidenced by the comparative insolubility of the latter? I believe the action is chemical; for I have noticed that plates which have been kept, including "Kennett" plates, are generally very difficult to wet sufficiently so that they will "take" the developer, especially at the edges. Thus, here is what I should call a spontaneous action of the gelatino-bromide film.

In a late leader (page 289) you say that silver bromide may be acted upon by organic matter after the former has been formed in the film—that is, made more sensitive by such action. But how does this agree with the result of the experiment published in a former leader, at page 278, in which pure silver bromide added to collodion turned out less sensitive than an emulsion made with soluble bromide in excess? I do not think that organic matter increases the sensitiveness of a film unless it be present at the time of the formation of the silver bromide, or, at least, when free silver nitrate is present. I think every plate treated with an organifier, after washing the free nitrate from the same, is less sensitive in consequence; the organic matter restrains the action of the developer.

I have made a comparative trial of Mr. Newton's method of adding chloride of gold to an emulsion, but find no advantage. I added one

drop of a ten-grain solution of the chloride to two ounces of Liverpool emulsion. After keeping for two weeks, at a temperature generally under 60° Fah., a plate was compared with another made with the plain emulsion, with the result that the latter had most detail. As I have before proved, Mr. Newton is quite right in saying that, after keeping a week, the emulsion will not fog through the addition of chloride of gold. It seems natural that the alkaline developer would reduce the chloride of gold. It seems, therefore, probable—or even a fact—that the gold combines in some way with the silver bromide. Still, is there any advantage to be gained by this compound? My experience is adverse, and I have heard from one gentleman, whose name would have great weight, that he found no advantage in the addition. Can Mr. Newton guess at the cause of our failure to experience the gain in sensitiveness he speaks of?—I am, yours, &c.,

Cotheridge Court, Worcester, HERBERT B. BERKELEY.
June 26, 1876.

EXCHANGE COLUMN.

A full plate lens will be exchanged for nitrate of silver or chloride of gold.—Address, J. L., care of H. Greenwood, 32, Castle-street, Liverpool.

ANSWERS TO CORRESPONDENTS.

PHOTOGRAPHS REGISTERED—

A. M'William, Kirkcowan—*View of Memorial Marble Tablet.*

A. Donald, Dundee—*Five portraits of the Rev. George Gilfillan.*

William Turner, Leeds—*Six portraits of the Rev. Canon Jackson.*

Silvester Parry, Chester—*Interior of Chapter House, Chester; Chester Cathedral; Museum Tower; and four views of Water Tower, Chester.*

☞ *Correspondents should never write on both sides of the paper.*

A. MARSCHALL.—A private reply has been sent.

J. F.—The company about which you inquire has long ceased to exist.

S. BIRCH.—We are unable to give the desired information, as Mr. Dallas's process has never been published.

R. D. (Cheltenham).—When we next pass through Regent-street we shall examine the picture to which you have referred.

B. O. M.—The background is not very effective, but by judicious printing and the use of a mask any inherent defect will be removed.

OXONIENSIS.—Try the addition of one or more drops of creosote or carbolic acid to the gelatine. These will prevent its becoming decomposed.

W. S. (Edin.).—Add a teaspoonful of kaolin to the discoloured solution of silver, shake well up for a little, and then filter. The solution will now be quite limpid and free from colour.

C. B. B.—The cause of the collodion washing off in the manner described is to be found in its horny, contractile nature. To remedy this give the plate a preliminary coating of diluted albumen, consisting of the white of one egg to a pint of water.

S. M'GEORGE.—There is no necessity whatever for your having a heliostat erected, because the exposure would not require to exceed three or four seconds, and during that period the motion of the sun would not produce any appreciable ill effect.

L. C.—The best way will be for you to send, per post, a specimen of your work, selecting for that purpose the strongest impression that you have been able to produce. We shall then be in a position to give you hints by which its quality may be improved.

G. S.—The chief feature in Stillman's camera is the novel method adopted for tilting the back. This method has been described in this Journal and in our ALMANAC for 1874, and upon reference to the latter the principle of action will be readily comprehended.

P. MARTIN.—The German glass bath will prove much the lighter of the two; but in making a selection see that the sides are rather convex or rounded outwards, for many German baths are so constructed as to render it a matter of difficulty to immerse a plate without injuring the collodion film.

A. S. GLOVER.—By removing the diaphragm a little farther—say half-an-inch—from the lens the field will be flattened by the improvement of the marginal definition. Although the circle of illumination will be reduced the area will still be sufficiently large to enable you to cover a 6 × 8 plate to the extreme corners.

PYROGALLIC.—By increasing the distance between the two stations from which the binocular views are taken a greater amount of stereoscopic relief will be obtained; but this departure from nature will only result in distortion, the special form in which this evil is apparent being the imparting of an incorrect amount of depth to the subject estimated from front to back.

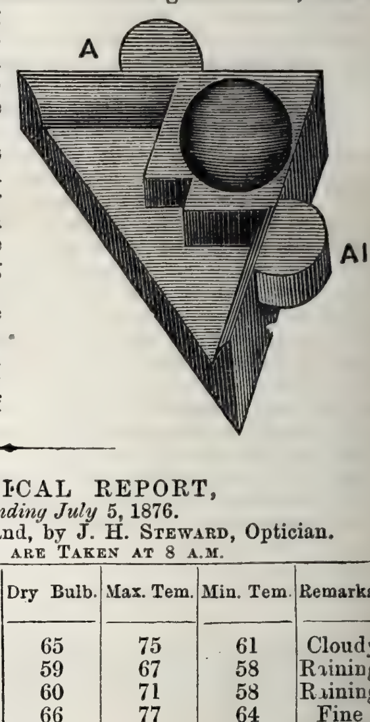
CHARLES S. REID.—This correspondent inquires—"What is the equivalent focus of a combination of lenses, such as the portrait combination? and is there any very simple means by which I can discover it?"——In reply: the equivalent focus of a combination is equal to that of a single lens which produces an image of any special object at a given distance upon precisely the same scale as the former.

T. BARBER.—Make a saturated solution of magnetic oxide of iron (the scales from a blacksmith's forge) in hydrochloric acid, and, having made the brass-work quite clean, immerse it in the iron solution, when it will very speedily acquire the black colour that is desired. The application of a solution of chloride of platinum will effect the same purpose. The latter solution is most used by opticians for staining brass-work.

G. H. L.—In reply to the question—"Which is the better—a refracting or a reflecting telescope?"—we commence by observing that for instruments of small dimensions refractors are much the better. But when the size is increased then reflectors compete with great force, because they possess this incalculable advantage—that the diameter can be increased to an extent quite impossible in the case of refractors. Hence, as there is in reflectors only one difficulty to be encountered, namely, the spherical aberration, and as that can now be eliminated with a degree of perfection that is almost astonishing, an achromatic objective cannot be made to compete with a reflector, both being of a given focus and having no restriction put upon their apertures or diameters. For photographic purposes we strongly recommend the reflector, because you can calculate with certainty upon the absolute coincidence of its visual and chemical foci; whereas, if the object glass of the refracting telescope be good, it is equally certain that it will *not* work to focus.

"PHOTO-ARTISTIC" WORK.—From Mr. P. Piquepé, of the Photo-Artists' Company, Milton-road, Acton, we have received a sample packet containing specimens of the work of this company. It comprises masks of various forms and sizes, specimens of enamelling and printing, examples showing the effects of retouching, and samples of white and tinted albumenised paper. Of the last of these we are unable to offer any opinion without a trial, to which we have not subjected them; but the fine and even texture approves itself at once to the eye. The examples of enamelling are very rich, the surface being exceedingly fine, having in this respect as strongly marked a resemblance to a *vitrifiable* enamel as it would appear possible to secure with a paper picture. The specimens showing the beneficial effects arising from skilful retouching when legitimately applied are excellent. To enable a comparison to be made there is a print taken from the negative both *before* and *after* it had passed through the hands of Mr. Piquepé, who has executed his work in a thoroughly clever manner. The little packet is tastefully "got up," and its varied contents are very suggestive.

GLASS CORNERS FOR DARK SLIDES.—The dark slides of American cameras are not unfrequently furnished with solid glass corners, of the form shown by the accompanying illustration. These glass corners add to the firmness of the dark slide, as the semi-circular projections A, A 1 are embedded in the wooden framework of the slide. There are two notches in the glass which allow of a plate being laid either lengthways, up and down, or across in a square dark slide. When glass corners are used there is the advantage of the plate only coming in contact with glass; but this is, perhaps, counterbalanced by the ease with which they can be broken, especially in large dark slides, and the considerable addition they make to the weight and bulk of the latter.



METEOROLOGICAL REPORT,

For two Weeks ending July 5, 1876.

Observations taken at 406, Strand, by J. H. STEWARD, Optician.

THESE OBSERVATIONS ARE TAKEN AT 8 A.M.

June.	Bar.	Wind.	Wet Bulb	Dry Bulb.	Max. Tem.	Min. Tem.	Remarks
22	29·99	NE	58	65	75	61	Cloudy
23	29·97	NW	58	59	67	58	Raining
24	29·90	E	59	60	71	58	Raining
26	30·00	NE	59	66	77	64	Fine
27	30·19	NE	56	61	80	52	Fine
28	30·16	E	60	64	—	57	Hazy
29	29·99	NE	56	62	72	56	Bright
30	29·97	NW	55	60	72	52	Hazy
July.							
1	29·95	W	60	65	72	59	Dull
3	30·15	E	59	66	78	62	Dull
4	30·08	W	61	66	74	59	Cloudy
5	29·97	W	61	65	—	61	Cloudy

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THE BRITISH JOURNAL OF PHOTOGRAPHY.

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A NEW EFFECT IN PROTRAITURE: THE MEZZOTINT VIGNETTE.

When the Vanderweyde process of finishing enlargements was introduced the peculiar effects realised by that process were immediately noted. But as the process had been made the subject of a patent, and as licenses for practising it had been granted on an exclusive and not over-wise system, two results immediately followed—the first being an endeavour to show that the matter patented was not new; while the second was an endeavour to show that the results obtained by the patented process could be equally well secured by means other than those for which "Royal Letters Patent" had been granted.

We have still to await the advent of the far-reaching intellect possessing an universal knowledge of everything which has been suggested in connection with this or any other photographic matter, and able in a moment to pronounce dogmatically upon the absolute novelty of any idea or suggestion brought forward; hence, although we know that numerous indications were given of correlative methods of producing what at that time we designated "Vanderweyde effects," we do not at this moment remember having seen among such suggestions anything of a character precisely similar to that which it has been the good fortune of Mr. Richard Brown, of Liverpool, to introduce.

In our twentieth volume—that in which we epitomised the photographic transactions and discoveries of the year 1873—we devoted several articles to a description of the new and patented methods of producing Vanderweyde effects in portraiture introduced in consequence of, or as an improvement upon, the original Vanderweyde process. The object of all those improvements was to produce a granulated or stippled effect upon the paper outside the limits of the portrait itself.

Among such methods we may mention that of Mr. R. Faulkner, who placed a sheet of emery- or glass-paper upon the picture and then passed the two between rollers in order to abrade the surface, the face and other portions being protected by the interposition of paper, india-rubber, or other thin film of gelatine or collodion. To this granular surface the colour was applied in the form of powder or otherwise. The roughening of the surface was also effected by sprinkling certain parts with the abrasive powder, and subjecting it to the action of a roller after covering it with a smooth plate of metal.

Another mode consisted in varnishing a transparency with a matt varnish, and then backing it up with a sheet of paper to which a grain had been imparted by the admixture of sand with the crayon powder. This method was introduced by Mr. J. E. Palmer, of Stonehouse.

Other methods have been both suggested and introduced, and it is quite possible that the simple but very effective system now to be described may have been previously suggested; but if it have we are not aware of it, or else it has escaped our memory at the present moment.

The "mezzotint vignette" is a name which has been given to a very effective style of portrait just introduced by Mr. Richard Brown—a gentleman whose name was long connected with the late firm of Vandyke and Brown, of Liverpool. In this pictorial novelty Mr. Brown's name is associated with that of Mr. Barnes, the names of of both gentlemen being stamped upon all the specimens we have had submitted to us. These examples, when looked at from some slight distance, appear to be merely vignetted portraits such as may be seen every day; but, when more minutely examined, the paper upon which they are printed is seen to possess a fine granulation, somewhat similar to that on morocco leather. The face and figure are exempt from this granulation, and by contrast appear much finer than otherwise would have been the case. So perfect is the semblance of roughness and texture on the surroundings of the head and bust that one's first impression is similar to that of the operator who, after an introspection of the first specimens produced, admitted their effectiveness, but suggested that all the granulation would be flattened under the rollers and quite disappear under the burnisher. The fact, however, is that the granulation is only apparent and not real, and the more the print is burnished the better will the apparent granular surface become developed.

The method by which the effect is produced is undoubtedly quite as simple as the effect itself is charming. A negative the size of the *carte* or cabinet portrait is first of all obtained from such a surface as a sheet of morocco leather; for, after numerous trials to ascertain the kind of grain by which the best effect could be produced, this was found to excel all others. The light by which the leather is photographed must fall upon it at an oblique angle so as to cause the markings to appear in high relief, which will not be the case unless the light fall upon it from one side rather than from directly in front. Having in readiness a negative produced in this manner the picture is first printed as a vignette as usual, and then, a mask of thin coloured paper or other opaque material having been superimposed upon the face and other portions of the figure covered by the granulated negative, it is exposed to light for such a number of seconds or minutes as will prove sufficient to print the stipple upon the white ground of the vignetted picture. The photograph is then ready to be toned and fixed.

In the method described has been produced several most exquisite specimens we have received, and which we shall have much pleasure in showing to those who call at our office for that purpose. We quite share the opinion of Mr. Brown to the effect that the "mezzotint vignette" is one of those small things in photographic art which is likely to prove of great service to professional photographers as a novelty which can be strongly recommended on account of its genuine merits, while its cost to the photographer himself is so trifling as scarcely to admit of being estimated.

With a view to ensure the "mezzotint vignette" receiving a fair share of notice from the profession Mr. Brown has secured it by patent, for he rightly concludes that his brethren are inclined to undervalue that which costs them nothing. It is his intention to make a small charge for licenses to those desirous of using the invention,

the largest portion of the proceeds arising from this source to be handed over, after expenses are defrayed, to the fund of the Photographers' Benevolent Association. Such a generous course of action requires no comment.

ON THE COMPARATIVE INFLUENCE OF IODIDE ON DRY FILMS.

The question whether iodide of silver is an advantage in connection with dry plates is one which has been frequently asked, and answered in a great variety of ways. Some aver that it is quite useless; others hold it to be inferior, in many respects, to bromide; while a third party assert that the admixture of a certain proportion of the iodide greatly enhances not only the sensitiveness but also the other qualities of a bromide plate. In wet-plate work the mixed salts still retain, and in all probability will continue for some time to do so, the first place in public estimation; but in dry-plate and emulsion work the most rapid methods recently introduced have been based upon the use of bromide alone.

We should except Mr. M. Carey Lea's process, which was published in our columns in March last year, and which received such a variety of criticisms as to leave it still in doubt whether the alleged improvement be real or only apparent. This process, which owes its distinctive character to the combination of iodide and bromide in an emulsion, is claimed by its originator to possess, amongst other good qualities, much greater sensitiveness than can be attained by bromide alone. Mr. Lea, however, insisted that the proportions laid down by him must be adhered to in order to ensure success; and as, in using those proportions, we were unsuccessful in obtaining the high degree of sensitiveness claimed, we recently instituted a series of experiments with a view of determining the real action of the iodide.

Our experiments were made with a series of emulsions containing progressively-increasing proportions of iodide, the quantity of bromide remaining the same in each. The practical difficulties met with in forming these emulsions were considerable, in consequence of the natural tendency of the iodide of silver to precipitate from the emulsion, and thus destroy its comparative value. In working Mr. Lea's process it has been shown by that gentleman, as well as by ourselves, that by adopting a certain course the emulsification of the silver iodide is a matter of the greatest ease; but it should be borne in mind that in Mr. Lea's process the conditions for such emulsification are present in their most favourable form. The chief of these conditions are—that the proportion of iodide to bromide shall be small, and that an excess of silver nitrate be present. Under these circumstances the formation of a bromo-iodised emulsion causes little more trouble than a simply bromised one.

The emulsions were subdivided into two classes, namely, those made with excess of silver and free bromide respectively. As regards the former class, as we have before hinted, the preparation of the emulsion was comparatively easy, but the latter condition entailed a considerable amount of trouble and also a degree of uncertainty as to the real quantity of iodide retained in suspension; indeed, with the larger quantities of iodide it was found impossible to form a workable emulsion without free silver. With the lower proportions considerable shaking as well as a great length of time were necessary to produce the desired result, and even then a portion of the silver haloids were precipitated in so coarse a state as to render it absolutely necessary to remove it by filtration. To a standard bromised collodion, containing in each ounce of solvents five grains of pyroxyline and eight of dried bromide of cadmium, were added respectively half, one, one and a-half, three, and five grains of iodide of cadmium. Beyond the last-mentioned quantity of iodide it was found impossible to go even with free silver.

The five samples thus obtained were divided into equal parts, one of which was sensitised with such a quantity of silver nitrate as to leave an excess of, as nearly as could be calculated, two grains per ounce; the other being left about half-a-grain per ounce short of silver. Very great difference was observable in the behaviour of the different samples—some emulsifying with readiness, others obstinately remaining in the flocculent state in spite of any amount of shaking. With free silver the emulsification became more difficult in proportion as the quantity of iodide was increased, all five samples, however, resulting in good workable emulsions. With the soluble haloids in excess the action was rather curious, No. 2 sample emulsifying more easily than No. 1, and No. 3 than No. 2; here the maximum appeared to have been reached, for No. 4 fell off sadly, being inferior to No. 1, while it was found quite impossible to produce a utilisable mixture from No. 5.

The emulsions thus obtained were first tested by merely coating the plate, washing until all greasiness had disappeared, and then drying. Equal exposures were given to the five samples containing, or rather made with, free silver; and the four remaining lots were exposed for a relatively longer time in order to meet their presumably inferior degree of sensitiveness. The development was in all cases performed with alkaline pyro., and as nearly as possible under similar circumstances as to strength. The result was simply that, in proportion as the quantity of iodide was increased, so did the vigour of the image under development. The operation did not appear to be accelerated in the case of Nos. 4 and 5—rather the contrary; but the deposit formed was of a stronger colour, at least by reflected light, and gave *the appearance* of a better-exposed and more vigorous image. The results were virtually the same whether with free silver or without, though in the latter the plates were cleaner, denser, and generally more vigorous. In no single instance, however, did the resulting image exhibit any real signs of having been *better exposed* than another.

A second batch of plates were prepared and treated in the same manner as the last, but subjected to the action of a twelve-grain tannin solution previous to drying. As regards vigour the results were much the same, only the iodide, as its proportion was increased, appeared to exercise a more marked effect in augmenting the brilliancy of the image. This organic action of the tannin was most noticeable in those plates prepared from the emulsions made with excess of silver—not only in respect of the increased vigour, but the images which in the former series of experiments were inclined to be foggy were now quite clean and bright. In point of sensitiveness the tannin plate containing the smallest quantity of iodide was appreciably inferior to the corresponding one, which was simply washed and dried; but, curiously enough, this difference became less noticeable in each succeeding plate in the series. From this it would appear that the alleged sensitising effect of the tannin upon silver iodide counteracts the retarding action of the former upon the bromide.

The remaining portions of the emulsions were then poured out, washed, and dried in the usual manner for forming pellicle. Previous experience having taught us that no useful result accrues from an emulsion containing free silver which is simply washed previous to drying, we resorted to Mr. M. Carey Lea's method of organifying, using for that purpose a solution of tannin acidified with acetic acid; the four samples prepared with soluble haloid in excess were simply washed and dried. The results obtained were, as regards vigour and sensitiveness, substantially the same as those already recorded, but the textural qualities of the films varied considerably in proportion to the quantity of iodide present—the larger the quantity the more granular was the nature of the film.

While the former experiments were in progress we varied our researches in a different direction. Two standard emulsions were made by the method first recommended by Mr. Houlgrave, of Liverpool—one simply bromised, the other iodised. This method consists in pouring out the collodion to set, previous to sensitising it, which latter operation is performed by acting upon the half-dried collodion by means of an ordinary silver bath, and completing the operation in the usual manner. By following this plan we hoped to secure immunity from the difficulties encountered in emulsifying the iodide, and by mixing the two emulsions in suitable proportions to secure results identical with those in the other series of experiments. One doubt arose in our minds, as to whether the conditions would be strictly identical in both cases, as, if we recollect rightly, Mr. Lea believes that the advantages which he claims for his process arise

from a combination between the iodide and bromide of silver at the time of their formation. How far such is the case our readers must judge for themselves; we will proceed to state our experience.

The two standard emulsions were formed with little or no difficulty, and were mixed in varying proportions, so as to reproduce as nearly as possible the first series of quantities. Upon mixing the two, to our astonishment an immediate "curdling" was produced, exactly similar to that experienced on adding silver to bromo-iodised collodion, and only differing in degree. It was not nearly so troublesome to procure re-emulsification, the difficulty increasing with the proportion of iodide. This would point to the supposition that the silver iodide and bromide react upon one another in some way even when not formed simultaneously. When tested in the same manner as the previously-described series we were unable to detect any material difference in behaviour, with the exception of a generally inferior degree of sensitiveness.

In conclusion: we deduce from this series of experiments that iodide of silver is, if anything, injurious to sensitiveness; that it tends to more vigorous development; that the action of a suitable organifier may lessen the injurious action of the iodide; and, finally, that the two haloids are capable of mutual reaction when co-existing in an emulsion, even if not formed simultaneously.

ROLLER SLIDES AND PELLICLES.

It is now rather more than a year since the roller dark slide was practically introduced by Mr. Leon Warnerke—an Austrian civil engineer, who, we are glad to say, has selected a London suburb as his permanent place of residence. We are quite conversant with the early history of the roller dark slide; hence we do not credit the gentleman named with its *invention*—although in his case, and from his being unaware that another had years before suggested it, it really was an invention—but that it has been practically introduced by Mr. Warnerke no one can doubt.

The tentative year through which the roller slide has passed has proved it to be an instrument capable of conducing very much to the comfort of photographers; and recent applications of this slide have shown it to possess properties not originally conceived—properties which, when rightly utilised, impart to the photographer a power not previously predicated. Here let us observe, *par parenthèse*, that in what we have said, or are about to say, we must be entirely absolved from any idea of noticing in a friendly manner any speciality of a certain *manufacturer;* for neither in the roller dark slide—which the public at large is at perfect liberty to imitate and manufacture—nor in the sensitive tissue which has hitherto been used in connection with it, is there the least restriction of manufacture. True, Mr. Warnerke undertakes to supply both, but any manufacturer in London or in the universe may do so likewise.

Our $7\frac{1}{2} \times 5$ camera has recently been fitted by Mr. Warnerke with one of the roller slides, and Mr. Tench, by whom it was made, has carried out in an effective manner the ideas of that gentleman. Hence, from the vantage ground of actual practice, we are now in a position to expatiate on the most recent form of pellicular photography when adopted in conjunction with the roller dark slide.

So much attention has of late been bestowed upon, or certainly directed to, the use of the roller slide as a means of obtaining panoramic pictures, we are sensible of the fact that little is left at present to add to what we and others have already said on this branch of the subject. We would rather here make some observations on the capabilities of sensitive tissue prepared with either collodion or gelatine emulsion. With regard to the latter we are still unable to add to what we have already said, but as respects the collodion tissue we are more fortunately situated. Previous, however, to more particularly alluding to it we may give one or two hints respecting the method of its preparation which Mr. Warnerke, as the result of a somewhat ripe experience, has now adopted.

A word or two, first of all, as to the method by which he produces his emulsion. A little over a year back Mr. Warnerke published the fact that he found the best and readiest method of making an emulsion to consist in pouring out the collodion (using a well-known commercial sample at that time) into a flat-bottomed vessel, and, after allowing it to set, pouring upon it a quantity of a solution of nitrate of silver, by which the thick collodion pellicle in the dish became sensitised throughout. The silver was then poured away into a bottle and the thick film thoroughly and rapidly washed so as to ensure the getting rid of soluble salts. This washing was effected by water, which was subsequently replaced by alcohol. When redissolved in ether and alcohol this pellicle formed an emulsion ready for use. To this method of forming his emulsion Mr. Warnerke still continues to adhere, and he recommends it as a method possessing certain advantages. Of course it can be kept in the pellicular form after the treatment with alcohol without being dried, by which facility of solution in ether is imparted. The sensitive tissue consists of a sheet of paper which has received a sizing of india-rubber in benzole, followed by a coating of plain collodion, these alternate coatings being repeated seven times in order to make a film of sufficient strength and tenuity to undergo the treatment which follows. The preparation is completed by its receiving a coating of sensitive emulsion.

As Mr. Warnerke has acquired great skill in the development of pellicular or tissue negatives, we shall describe with as much minuteness as we deem necessary the method of development recommended by him, and which we have adopted with unfailing success.

The edges of the undeveloped negative are, in the first instance, turned up to the extent of about an eighth of an inch so as to form it into a dish; this is laid upon a plate of glass, and a small quantity of methylated alcohol, containing a tenth part of benzole, is poured into this paper dish. In less than a minute it is poured back into the bottle, and may be again used for an indefinite number of times. The surface is now washed with plain water until "greasiness" disappears, after which the developer is applied in the following order:—

A.

Carbonate of ammonia	80 grains.
Water	1 ounce.

B.

Bromide of potassium	60 grains.
Water	1 ounce.

P.

Pyrogallic acid	60 grains.
Alcohol (methylated)	1 ounce.

Of solution A four drachms, of solution B four drops, mix and apply to the film. Twenty minims of solution P are then put in the developing-cup and mixed with the first solution, when the application of this new mixture to the sheet brings out the image in its full intensity. The development of an over-exposed negative is regulated by diminishing the quantity of pyrogallic acid, or increasing the bromide. In the case of under-exposure less bromide must be used, or it can be omitted altogether.

The fixing is effected by cyanide of potassium, and, after washing and drying the negative, the pellicle is stripped off the paper support. Should any difficulty be experienced in its removal—which we have never found—it is recommended to moisten the back of the paper support with benzole, which will ensure the removal of the pellicle.

It is important that the one-tenth part of benzole be not omitted from the alcohol used in softening the film, as this omission would cause the negative to be thin, uneven, and spotty. By its use the time of exposure is also shortened. For instance: a well-exposed negative was obtained on a cloudy day (Tuesday last), with an exposure of one minute, the lens employed being a slow one of the wide-angle class. This, and other negatives, may be seen at our Publishing Office.

On the whole, we anticipate a useful future for pellicular negatives obtained from sensitive negative tissue. The lightness of the latter as compared with glass is astonishing. For instance: our roller dark slide—to which reference has been made, and which is exactly of the bulk of two double dark slides belonging to the same camera—contains at the time we write this article no less negative tissue than

the area, or equivalent, of thirty-one $7\frac{1}{2} \times 5$ plates, with as much more area in addition as will suffice for turning up the edges of each negative to form it into a dish for convenient development; and the weight of all this is less *by sixteen ounces* than the two double dark slides alluded to when filled with their respective charge of four plates of glass.

INSTANTANEOUS PHOTOGRAPHY.

Although, in consequence of the high degree of perfection to which the preparation of dry plates has during the past few years attained, the practice of wet collodion has, for landscape work at least, been almost entirely relegated to professional photographers, there are several classes of pictures which as yet have not been satisfactorily produced by any other process, and to which amateurs would gladly turn their attention, notwithstanding the trouble which wet collodion involves, if the latter could be worked as certainly and as rapidly as might be required. But, unfortunately, this is just what cannot always be secured unless by the most experienced operators. The ever-varying state of the bath from the accumulation of the solvents and salts of the collodion, and the disturbing influences of the various changes of temperature which so frequently occur, sometimes tax all the knowledge which a long experience has imparted to keep the chemicals up to the ordinary working standard, and make the higher class of work—that generally understood as instantaneous—an achievement frequently longed for but rarely attained.

We have no doubt there are times and circumstances when even the most enthusiastic and successful manipulator of dry plates desires a film sufficiently sensitive to receive an instantaneous impression of scenes which occasionally arrest his attention. By "instantaneous," we do not mean such an exposure as is suitable for breaking waves or fine masses of even moving clouds, as both of the latter class of subjects may get an exposure of a very large fraction of a second, the movement merely serving to soften and probably improve, rather than injure, the pictures. We refer to exposures sufficiently rapid to delineate with perfect sharpness the various moving elements of a crowded thoroughfare, the intricate rigging of a ship in full sail, or the graceful action of a bird on the wing. That such rapid photography is a possible thing we have abundant evidence in many of the street views published from time to time, and also in wonderful studio and garden pictures by various artists—among others by Mr. Ross, of Edinburgh, in one of which a girl on a swing is caught just at the instant when the rope had reached the highest elevation; in another a girl is skipping, the picture showing the rope passing under her feet; while a third is that of a boy jumping over a large stone. The last is peculiarly interesting, as it was stated to be taken with a camera fitted with a number of medallion lenses, placed in threes, one above another. The exposures were made by causing a sheet of metal with a hole in it to fall so that the aperture was for an instant brought successively in front of each lens. To the lower end of the sheet was attached a heavy weight, and it was held up in such a position that the three lenses were all covered. At the proper moment the suspending thread was severed, and, although the time between the passing of the opening in the sheet from one lens to another must have been almost inappreciable, the plate showed the three pictures in very different positions.

Now, although we have ample evidence that such rapid work is possible, the fact that it is so rarely attempted is an equally clear proof that it is beset with many difficulties. But, as the true lover of photography is never more at home than when he is contending with and overcoming such difficulties, we are persuaded that if more general attention were given to this subject much of the difficulties with which it is supposed to be surrounded would disappear; and we believe that, if it had received a tithe of the attention which has been bestowed on some of the dry processes, really instantaneous pictures would not have been so scarce as they are at present.

Amongst the few who have given their attention to the production of the highest degree of sensitiveness of the wet collodion film there are some who have sought to find it in the addition of an easily-decomposed body to the collodion, or of a suitable reducing agent to the bath. Of the former of these methods probably the most successful addition was the iodide of iron; but we think it will be found that such adjuncts are wrong in principle, and that, although the sensitiveness of collodion may thus be increased, the instability likely to be introduced more than counterbalances any gain so obtained. Simplicity rather than complication in the material employed is more likely to lead to success, and a proper relation between the three factors—the collodion, the bath, and the developer—is now, we believe, generally understood to be the only road to extra rapid work.

Under this impression we have, during the past week, gladly taken advantage of an opportunity of assisting at a number of experiments with a view of ascertaining the most favourable conditions for such instantaneous work, and think a simple outline of the results secured may be of interest to our readers generally, and shall be glad if it induce any of them to turn their attention to this interesting department of photographic labour—one which, we think, could not fail to be commercially successful if really good instantaneous studies were freely published.

First, as regards collodion: very little reliance can be placed on much that is said of various samples brought under public notice. "Rapid" and "extra rapid" would seem to be only relative terms, as both were found to be much slower than many samples with less ambitious prefixes. There is in our mind little doubt that the pyroxyline of which the collodion is made exercises much influence on its sensibility, and that a porous film made from a powdery cotton, the result of the action of weak acids at a high temperature, gives a collodion that is not only more sensitive, but also a film that is much more easily rendered intense than that from a horny, close sample. Much has been written on the most suitable iodides and bromides, and, without pronouncing an *ex cathedrâ* verdict, we have found that when rapid work only is required, and where a little want of stability may be no serious objection, a collodion made from the kind of pyroxyline above indicated, and salted with three grains of ammonium iodide and one grain of ammonium bromide per ounce, will, after standing from ten to twenty days, give a suitable image with a less exposure than that made according to any other formula we have tried.

We are aware that such a simple formula has been often condemned on account of an alleged tendency to decomposition; but, as we possess at present several such samples that have been iodised for more than three months and are still in first-rate working order, we think the question deserves re-examination. The condition of the bath is, undoubtedly, an important consideration. Experiment clearly shows that it should not be of a strength less than forty grains and must be as nearly neutral as it can be wrought. A fresh solution of silver saturated with silver iodide will give a sufficiently sensitive film; but it will be weak and difficult to intensify. The result of many experiments leads us to believe that such a fresh bath, to which has been added at least twenty per cent. of one that has been used for a considerable time, will be found to supply the required conditions in the highest possible degree, and this especially if it have been made with *fused* silver nitrate instead of the ordinary crystallised salt. Of the three factors, the principal importance lies, we think, in the developer. In common with most experimentalists we believe that in almost all processes a developable image may be impressed by an instantaneous exposure if we only knew how to bring it out. A thirty-five-grain solution of iron with just sufficient acetic acid to prevent fog, or, better still, with one drop of collocine to each eight ounces, was found to answer very well.

With material so adjusted, in a good diffused light, and with a lens of medium rapidity, a number of pictures of an assistant—who, for the nonce, undertook the *rôle* of a conjurer tossing four balls—were taken, and in several of them the whole four are seen in the air sharply defined against the background, which was printed from a separate negative. The exposure was made in a way similar to that adopted by Mr. Ross; but the plate had a square opening instead of a round one, and it was drawn across the front of the lens by the rapid contraction of an extended elastic band. A series of such pictures thus truly suggesting action would assuredly command public attention and favour; and we feel convinced that any

photographer going heartily into the matter and placing them commercially in the market will find himself amply rewarded for his pains.

A passage in Mr. H. B. Berkeley's letter last week, which we had not then time to notice, appears to require a word or two of explanation on our part. The paragraph in question, at first sight, seems to amount to a charge of inconsistency against ourselves, inasmuch as Mr. Berkeley asks us to explain two *apparently* conflicting statements. We use the italics because, as the case is stated by him, the statements to which he makes reference are in direct opposition to one another, but we wish to show that Mr. Berkeley has misread one of them. Upon turning to page 289 we certainly find it stated that silver bromide may be acted upon by organic matter after its formation on the film, but *not*, as Mr. Berkeley continues, "made more sensitive by such action." We have always contended strongly against the idea of organic accelerators—at least in connection with silver bromide—and if Mr. Berkeley will reread the article at page 289 he will find the whole gist of it to be strongly in favour of that contention; indeed, it is stated distinctly that the whole of the organifiers used acted as retarding agents when allowed to dry on the film. With regard to the experiment quoted from page 278, this must be considered in connection with the particular matter then under treatment. Our object in the article in question was to prove that the silver haloid entered bodily into combination with the organic element in the collodion at the moment of its formation, in contradistinction to the simple action of the silver nitrate. The emulsion prepared from precipitated silver bromide must obviously be quite free from the slightest trace of the organic bromide, while those sensitised in the ordinary manner contain more or less, according to the relative proportions of the sensitising salts during its formation. The experiment recorded at page 278, in which the precipitated bromide emulsion is found to be more sensitive than an ordinary one, must be taken for what it is worth. It is not to be supposed that the results are at all comparable, but merely that pure bromide of silver, prepared in the presence of free nitrate, is more easily impressed and, perhaps, more easily reduced than the organic bromide *in the presence of free soluble haloid*. We perfectly agree with Mr. Berkeley's other remarks in the latter part of the paragraph, and trust that upon referring once more to the article at page 289 he will agree that we are correct in our explanation.

PHOTOGRAPHING BUILDINGS.

The difficulties of landscape photography, its pleasures and its drawbacks, have been so often and so ably treated there is little left to say that could shed much additional light on that trite subject; but I am inclined to believe that a few jottings suggested by my own experience in the direction of architectural pictures—if one may so class all subjects consisting mainly or entirely of buildings—will not be unacceptable to the tyro in that kind of work.

It must have been observed by any collector or any photographer who has critically examined the various photographs of buildings—and street views in particular—he has had opportunities of seeing that very few of them are good, and, further, that the proportion of such to landscapes was remarkably small. And yet, *a priori*, it should be expected that street views and views of particular buildings would be by far more readily and frequently taken, seeing that the major part of the possessors of cameras live where bricks and mortar do most abound, and it would seem so easy to the beginner to experiment, almost as it were, from his own doorstep; but who really ever does see pictures so taken? The main causes of this shunning of architecture are the following:—First, the necessity for suitable lenses; secondly, the trouble, supposed or real, caused by passers-by in the case of streets; and, thirdly and more especially, the almost disheartening frequency of fog on every plate.

The first difficulty, of course, can be almost entirely surmounted by a sufficient length of purse, as it is simply a question of cost. Thanks to modern lens makers there are few, even the most confined, structures that cannot be successfully transferred *in petto* to the sensitive plate; it is really surprising what can be accomplished in that way. It is only a couple of weeks since I was commissioned to take a lofty building in a narrow street, and which offered the greatest optical barriers. Selecting a house nearly opposite I had no difficulty in obtaining permission to take my apparatus up to the top room (it was a three-story building). The height of my subject may be guessed when I say that, though I was three stories high, I was not half the height of the pile of which I had to get a picture. I found, however, that it did not include an angle of more than ninety degrees, and so I concluded it could be done. Sending my operator with a 12 × 10 camera, he said he was sure the whole structure could not be included, even with the lens strained to the utmost advertised as its limit—that is, the eight-inch focus lens we had in the camera; but I boldly displaced it by a five-inch focus (!) lens, when, surely enough, every part was in the field, but naturally not particularly sharp at the edges. I, however, used the smallest stop supplied, and obtained a most satisfactory result—my client, an educated critic, being quite delighted with it. I need not say that, in focussing, the utmost care in adjusting the swing-back was required to avoid want of parallelism in the perpendiculars. The building taken as described, including chimneys, is at least ten inches high; nine inches of excellent definition can be seen on it. The part outside the nine inches, consisting of chimneys and paving stones, does not by any means mar the general effect by reason of its imperfect definition; so that I practically get a 12 × 10 picture with a five-inch focus lens. Much less than a score of years ago this would have been pronounced impossible.

Of course there are occasions when no lens at present made is able to do the work required without some special expedient. I may give an instance in my own experience. The latter end of last year I had to photograph the inside wall of a building against which was placed a machine, which also was to be included; the wall was about eighty or ninety feet long, and the width of building twenty-six feet. A very simple calculation will show that, under ordinary conditions, it was an impossible feat. I, however, went outside, and the manager took out the window for me. That I found did not give me angle enough, as I had to retire so far that the sides of the window-opening blocked the view. Finally, he took me a portion of the wall of the building down, for he was bent upon having a view taken; so that I dare say I may boast that I am one of the few photographers who has had the side of a house knocked out so as to be enabled to take a picture. The Editors have recently shown how, by a simple mechanical expedient, to increase the angle of view of a narrow-angle lens of the doublet type, so that it may be fairly said that, after all, the lens question can be met without a very great outlay.

To meet the second difficulty I have named very little is required. In street views it is needful either to take instantaneous pictures which would include figures or to put in a diaphragm of so small an aperture that in the long exposure required the passing by of anything but a procession would do no harm; though, if an unusual proportion of white-robed figures passed by, it might be advisable to temporarily cover the lens. For single buildings, &c., the camera may be either placed overhead so as to look over the heads of pedestrians, or a few of them asked to stand still to form a picture—a polite word or two generally sufficing to turn others out of the field, as their presence might interfere with one's "models."

I now get to my third greatest difficulty—that of fog; and if my readers have never tried it I cannot fully describe to them the distressing difficulty that surrounds the production of a photograph of a building (I am speaking more especially of those in towns)—or of a street—free from it. We all know how, in case of a landscape, for a proper light, or a suitable phase of that light, we often wait weeks before a fitting occasion offers; but for a building one may wait months, I might almost say years, before the state of the atmosphere is such as will afford a chance of obtaining a clear, unfogged negative. Naturally a simple and sufficient easy explanation can be given when sought for—it is the persistent and pervading contamination of the atmosphere with smoke. In large towns it is next to a miracle ever to find the atmosphere clear in the middle of the day. Only plenty of practice will enable the operator to correctly judge of atmospheric effect in this respect. Many a time conditions of illumination which, to the general landscape or portrait photographer, would appear perfect are recognised by the adept as being quite unsuitable; and nothing but practice will enable a correct judgment to be formed on these points.

The length of time that the air retains particles of soot is most remarkable, as is also the slight degree of such contamination which suffices to mar a picture. There are certain guiding principles which aid us in judging of the probability of the weather. For instance: the meteorological conditions most *un*suitable for landscapes with trees, &c.—that is, plenty of wind—is the *most suitable* for town work. The gusts of wind coursing through the streets with purifying vigour lift up the fuliginous pall and offer almost the sole

opportunity for good work. They seem not only to raise the murky air but to clarify it; just as by shaking up precipitates (as, for example, silver chloride) the finely-diffused particles coalesce into larger agglomerations, so may we imagine that the particles of soot coalesce and in a similar manner fall to the ground. Another probable guide as to clear atmosphere is rain. It is nearly always clear and free from soot immediately after, and often immediately before, rain.

The wind is also useful in a further degree, in that we can pretty accurately predicate the amount of clearness by finding from which quarter it blows. Certain blocks of surrounding buildings give off more smoke than others, and that point must be watched. A "blowy" day (if showery, all the better), with the wind in the best quarter—no special smoke nuisance at the time being carried on—should be selected. I remember once photographing a parish church on what seemed to me a most beautiful day. I exposed; result—fog! This surprised me, so that at the next exposure of the plate I looked all the time at the building. The mystery was soon solved; a neighbouring manufactory was pouring forth from its huge shafts, every now and then only, masses of smoke, the lighter portions of which, forming, swept in gusts across the field of view and spoiled it. There was nothing for it but to find out the furnace-man and "tip" him not to let his fire get low, but to feed his furnace in the proper way, *i.e.*, gradually, and with the fuel to the front, instead of being pitched all over the glowing cinders.

On one occasion, when a lonely building far away from town would not yield results to please me, a gardener was found out as the culprit. A thin, mist-like veil of smoke ever and anon wrapped up the premises in its fogging embrace; and it needed a practised eye to notice it, but, once noticed, *baksheesh* to the gardener made all right.

It often happens that, when taking views of country houses, the cook at work at her fire often suffices to mar otherwise perfect work. A direct "tip" of cash cannot always be administered to such a magnate; but temporary friendship can generally be struck up with her by the promise of a view, or, at worst, to take her portrait when she comes up to town. In photographing a village church, when lying in the immediate vicinity of cottages, its position and bearings in regard to the village itself should be taken, and, if possible, a day selected when the wind blows *over* the village *from* the church. I have personally experienced the effects of not taking this precaution; but, when there is no choice of occasions, it will generally be found that there is least smoke between dinner and tea time, when economical souls, in midsummer time, allow their kitchen fires to go nearly out and the smoke is reduced to a minimum.

These details may all seem trivial, but they are the result of practical experience in a path which not many care to tread, and they are offered with a full expectation of their proving of use, simple though they appear—to the tyro more especially.

I must conclude by pointing out that summer mornings, a little before six o'clock, are often very suitable. The soot falls during the night and clears the air; and the morning fires not being yet alight, the finest chance of all is afforded, if the light be good, for getting the best kind of studies in architecture.

G. Watmough Webster, F.C.S.

FADING OF PRINTS AND CARBON PRINTING.

In a number of the Journal published a few weeks since the Editors gave some hints to amateurs for which the former deserve thanks, as I think those hints will save them much trouble, expense, and, I may add, disappointment.

There are three processess which are supposed to be permanent, namely, the heliotype, the Woodbury, and the autotype. The two former are quite out of the question; they require expensive and bulky machinery, attended with an amount of difficult manipulations which amateurs are not likely to encounter. The autotype is more hopeful, but until it is made cheaper and a good deal easier to work I do not think it will be generally adopted.

For the present amateurs must be satisfied with silver printing; and, speaking from a very long experience, I take a much more cheerful view of the permanence of silver prints than most people do. These pictures have got a bad name; but it has arisen from a cause which is not difficult to explain.

We live in times when, owing to competition, cheapness is much more thought of than good quality; and this has forced professional photographers to send out pictures which they know are not half washed, and which they equally well know must fade in a few years. Water in towns costs money; the quantity used in a town house is most accurately gauged by a meter and charged for accordingly.

I recently read an account of an establishment in London which printed a thousand pictures daily. Now, let any man who has washed half-a-dozen pictures properly, and who knows the vast bulk of water required for even that small number, calculate the quantity necessary to wash a thousand! A small river would be required. The country, in consequence, is inundated from Cornwall to Caithness with these half-washed prints. I call them "diseased prints," as all are affected by a disease as sure to destroy them as a cancer is certain to kill a human being. It is, therefore, very natural that the public who purchase these prints, and who find that they fade, should put it down as an established fact that all silver prints must necessarily do the same.

I believe this is a mistake, and I am satisfied that if amateurs (I address this communication entirely to them) are content to print a small number of pictures at a time—say half-a-dozen—to put some carbonate of ammonia in the hypo. fixing bath (for which there is a good chemical reason), and then to expose them for three or four hours to a continuous stream of water always changed by means of a syphon, most of their prints will be blooming long after the greater number of my amateur friends have faded away for ever.

There are, no doubt, causes of fading which are beyond our control, owing, again, to the dishonesty of the times. We purchase albumenised paper which is now and then coated with some adulterated stuff that is not albumen. The mounts also occasionally contain some poisonous chemical which destroys the prints; but, as a rule, if we wash the prints for a sufficient time in running water, and do not put too many in one washing apparatus, so as to cause them to cling to each other, silver prints are so far permanent that five per cent. should cover the failures.

Great allowances must be made for professional photographers. They must live, and they must make a livelihood by selling their pictures. If the public prefer the cheap and transitory to the higher-priced and permanent prints the professional photographers are—I am sure unwillingly—obliged to yield to the exigencies of the case, knowing that if they used a sufficient quantity of water to wash their pictures thoroughly they would be obliged to charge a much higher price for them.

Before I conclude I must, in justice to a gentleman whom I have employed a good deal as a printer within the last eight years (Mr. Belton), state that up to this date I have not seen any symptoms of decay in his prints. In the case of pictures printed by myself, and which have faded, I have generally seen some indications of photographic disease before the lapse of eight years.* Horatio Ross.

NOTES FROM THE NORTH.

There are many ways of "raising the wind," and it would seem that photographers are not more exempt than other men either from the necessity for, or from the adoption of, questionable means of doing it. In the Sheriff Court here, a few days ago, George Williams and Charles Brown were each, on their own confession, sentenced to sixty days' imprisonment for fraud and wilful imposition. From the complaint it appears that they had visited some of the public institutions in the suburbs and induced the servants to sit for their photographs, showing them in each case the negatives, and promising in return for payment—which, of course, was made in advance—to send them a certain number of copies as agreed upon. The prints, of course, never made their appearance, and proceedings were instituted with the above result. So far, the case was similar to many that have been reported from various parts of the country; but Messrs. Williams and Brown would seem to be possessed of a genius beyond the average of their kind, as, according to a statement of the Procurator-Fiscal, they imported into their transactions a bit of quiet humour worthy of a nobler cause. Anxious, as all photographers naturally are, to reduce their *impedimenta* as much as possible, they carried with them *only one plate*, and after showing probably a pretty positive and pocketing the price of the promised dozen *cartes de visite*, washed it off to be ready for the next sitter.

Is anybody still troubled with photographic blisters? If so, here are two cures, each of which I was recently assured by those employing them—both photographers in large practice—is an infallible remedy. The first is to keep the paper damp, or, rather, don't let it get very dry. This condition may readily be secured by keeping the paper lying flat in a slightly damp cellar. This expedient, although somewhat contrary to the usual teaching, is easily tried, and the success of practical experiment is worth more than even a good deal of probable theory. The other method is to transfer the prints from the fixing solution to a ten-per-cent. solu-

* On examining several photographs printed thirteen years since, by Mr. Ayers, we find no indication of fading in them; hence silver prints do not necessarily fade.—Eds.

tion of common salt to which a little ammonia has been added, and leaving them there for fifteen minutes before the ordinary washing is commenced. Those who have been in the habit of attributing blisters to the difference between the specific gravity of the hypo. solution and the water to which the prints are usually transferred will see a probable explanation of the alleged good effect of this remedy, while those who have doubts on that question may, nevertheless, consider the remedy simple enough to deserve a trial.

Babies are proverbially a source of trouble to the photographer, but I have an idea that dogs are more so; and yet there are some men who seem always to meet with much success in that department of the art. On asking one of these, a few days ago, as to the cause of his success he at once replied:—"In the first place, I always insist on a dog being brought in a cab, because if allowed to walk along the street it is almost certain to come panting and with its tongue hanging out to such an extent that a good picture is impossible; and, in the second place, just before removing the cap from the lens I get an assistant to conceal himself behind a screen, or outside the studio, exactly in the direction in which I want the dog to look, and to give several pretty loud raps. This attracts the dog's attention, and the difficulty of at once ascertaining from whence the sound proceeds keeps it perfectly steady long enough for any ordinary exposure."

I recently came across a neat little calendar intended for the waistcoat pocket. It had been issued by an enterprising photographer to his customers, and had on one side the usual information as to days and months, and on the other side, in addition to his address and list of prices, some very good advice to intending sitters. One item of this struck me as being so good as to deserve a prominent place in every studio. It was—"*Suggest*, but do not dictate. An artist knows what will suit you, and for his own credit will do the best that is possible under the circumstances."

The unfortunate medal question, as will have been seen from recent numbers of the Journal, has had a disturbing influence on the usual good humour of the Edinburgh Photographic Society, and, for the first time, caused no little strife and bitterness of feeling—a thing the more to be regretted as, during the fifteen years of its existence, there had not previously been an indication of even a serious difference of opinion amongst its members. In the interests of peace it is to be hoped that the minority will enter heartily into the exhibition arrangements, and each do his best on an occasion when there will be so much for all to accomplish in securing a success in which not Edinburgh only, but all Scotland, is concerned. The unpleasantness is likely to give the Society cause to mourn the loss of two of its oldest and much-valued members—a fact which, along with many minor evils, should be laid to heart by photographic societies in general, and taken into consideration whenever the medal question crops up.

I understand that the committee which usually undertakes that duty has just completed the arrangements for the annual holiday, on which almost every studio in Edinburgh is closed, and when employers and employed are wont to mix in a happy "outing." Through the kindness of Lady Ruthven, the grounds of Winton Castle will be open to the party on Thursday, the 27th inst., and they will go and return by special trains. If one may judge from the success of previous years we may look forward, in anticipation, to a thoroughly successful trip. It must not be forgotten, however, that much of the comfort and success of such excursions depend on the completeness of the arrangements, and, therefore, it is absolutely necessary that tickets be secured as soon as possible, so that the committee may be enabled to discharge its duty properly.

John Nicol, Ph.D.

THOUGHTS ON PLAIN SUBJECTS.

Of the thousands who daily present themselves for their portraits at photographers' studios a very small proportion could be passed as approximatively perfect by the most lenient critic of form and feature. Many people see perfections in themselves which (although totally invisible to others) they expect that hardly-used man, the photographer, to perceive, and give them a fair presentment of themselves as existing only in their own imagination. Some people seem shocked and disgusted at their real appearance, nor will they believe they "look like that" on examining the rough proof for the first time. Familiarity with their portraits will, after a time, soften off the disagreeable impression first entertained; and self-love will, by degrees, metamorphose the "ugly thing" into "well, I don't think it so bad after all." But it should be borne in mind that *first* impressions have a marvellous influence; so a photographer, if he value his connection, must not send out a rough proof with defects exaggerated, and trust to verbal explanations making the desired favourable impression and inducing a liberal order.

The universal standard of beauty is—self. Most people's ideal is founded on a similarity to themselves—so far, at least, that persons like themselves are never acknowledged to be ugly. This is in accordance with the instincts of human nature. Those with snub noses consider snub noses a high type of beauty. Those who possess noses of the hat-peg and eagle's-beak style think their own peculiar formation the type of all that should exist. The majority of people are blind to their physical defects. Familiarity cannot, in this case, be said to "breed contempt," but rather blindness.

I remember once an elderly gentleman coming to me for his portrait. He was blessed with beauty of the Darwinian type—that is to say, with much jaw and no nose to speak of. He sat, was photographed, and his picture was sent home, the photographer considering it a success. The next day he paid me a visit, and, holding out the card, said—"Do you call that like me?" I innocently replied that I considered it a good likeness, and was going on to explain the excellence of the photograph, the remarkable quietude with which he had sat, &c., &c., when he stopped me by again saying—"You really consider this a good photograph?" I assented. He then added—"If it be, then I'm the ugliest d—— I ever saw! You had better take me again, for I will never have these." I took him again, and, acting on the hint that considerable flattery was to be introduced, I succeeded in giving a tolerable amount of satisfaction.

It is very impolitic to be too matter-of-fact, as most people are exceedingly "touchy" respecting any reflections that are not laudatory of their personal appearance, and such remarks are not taken in the most heavenly and forbearing spirit. As a rule, the handsomer a portrait is made the more satisfaction it imparts. The *true* likeness is a secondary consideration—youth, dress, and jewellery primary ones. With what persistence some people *will* spread out a jewelled hand after it has been carefully and neatly disposed within the fold of the dress! You may repeat the pose half-a-dozen times, yet as soon as your back is turned the obnoxious hand will again be conspicuously displayed. When the results are submitted for approval the first remark will probably be—"How well the hand comes out! You can see the rings quite distinctly!" This is usually said with the utmost *naiveté*, as if it were quite by accident that the hand occupied such a prominent position. The operator knows how ingenuous the remark is, and says nothing more than that he is glad the portrait is approved of. But I am somewhat digressing.

Plain people, as a rule, if allowed to select their own attitudes (I allude to faulty figures as well as faulty faces), invariably choose the least becoming from an artistic point of view. Persons with broad mouths and noses inclining to one side almost always wish to be taken full face; angular people pose themselves symmetrically in a zigzag fashion, or lattice-work form, fronting the camera. Few persons not possessing artistic feeling know what pose will be best suited to their peculiar contour or dress, and very often much persuasion has to be used to obtain a good position. Of all difficult specimens with which photographers have to deal the most so is when the upper row of teeth project much. Profile, three-quarter, or full face—none seem becoming; but it fortunately happens that the possessors of such obtrusive incisors frequently have good eyes and upper part of the face, and a pose that partially hides the mouth will often result in a good portrait—flattering, but truthful. Receding chins should rarely be taken in profile. The same may be said of a remarkably ugly nose; for, no matter how characteristic it may be, the possessor rarely cares to have such characteristics made the most of in black and white, save a few eccentric exceptions who think the "jolly red nose," shaped like a knot on a log, something to be proud of. Such misguided appreciation is happily rare.

The mouth that goes up on one side more than the other is often a source of trouble. The artist may overlook the defect till the portrait is taken, when it is too late to be remedied. Some will not acknowledge this defect, whatever you may say, and wax quite indignant if you mildly insinuate it. One injured fair one, on seeing the proof of her portrait, gave a sniff and said—"If the photographer cannot make my mouth straight he had better give up business! What are photographers for?"

Few plain people are ever satisfied with a photograph of themselves unless considerably worked upon and improved. If they say nothing they heave a sigh and look miserable, and do not order freely, which comes to the same thing. There has been more than one first-rate business made by cultivating the patronage of plain people. Many photographers look very shy at this class, and set it down as a fore-

gone conclusion that to try to make a presentable picture is a hopeless task—consequently do not try. What is the result? Simply this—the plain persons "come out" more plain still, and are very often vile caricatures, exaggerating the defects and disguising any good points that may exist—conditions not likely to give satisfaction or increase the number of clients. When a man sets up in business he is sure to have a great proportion of very plain people on whom to exercise his talents—persons who look on a new photographer as another chance of getting what they have never been able to get before, viz., a good-looking portrait, and not a literal copy of themselves. If you succeed in pleasing there is little fear but that it will be a good advertisement—ten times better than making a pretty picture of a lovely girl.

Thoroughly graceful and good-featured people always photograph well, and it is no great triumph to make an excellent picture of such —anybody can do it that can photograph at all; but they who can make something pleasing out of bad materials deserve, and undoubtedly get, the best business, other things being equal.

Generally speaking a portrait should not be taken in profile unless it be a good one. Never show the whole of a large mouth; choose the best side of the face. Few noses are set straight; pose the head to make them appear so. If the sitter squint, do not let it show. High-shouldered people require the camera lower than others. Those with deformed spines are usually taken best when sitting. A stout lady should never be placed on a high stool, nor a lanky man taken standing. There are many other thoughts which crop up in connection with the portraiture of plain people; but sufficient for this paper are those already enumerated.

EDWARD DUNMORE.

FOREIGN NOTES AND NEWS.

A NEW HELIOGRAPHIC PROCESS.—A VISIT TO HERR BRAUN'S ESTABLISHMENT AT DORNACH.—NEW REGULATIONS FOR THE SALE OF POISONS IN AUSTRIA.

IT is reported that Herr Richard Falk, of Berlin, has lately exhibited specimens of a new kind of heliography, in which the picture is in the interior of the paper and, consequently, is not visible when either side of the paper is looked at, but is only seen when held between the eye and the light. This process has been recommended for bank notes instead of the usual water-mark; but we fail to perceive wherein the advantage of the proposed change lies.

The *Schweitzer Photographen Zeitung* contains a short account of a visit to the establishment of Herr Braun, of Dornach, whose carbon pictures are so well known. The establishment is situated close to the Mühlhausen and Dornach Railway, and has quite the look of a large manufactory—an idea which receives further confirmation when one comes to see that the business is carried on by the help of a steam-engine. On entering the eye is first caught by the large studio, whose glass roof describes a quarter of a circle, in which reproductions, enlargements, and portraits are taken. Then comes the printing premises, and at the further end another projecting glass roof. Beyond stretches a long, sloping glass roof, under which the printing is done in winter. Adjoining this is a small laboratory in which Herr Braun, jun., personally tests every roll of carbon tissue sent into the market.

In the printing department there are in use at present some two hundred printing-frames, of all sizes, which are attended to by three or four operators. Nine-tenths of the pictures produced are in carbon, only one-tenth being ordinary silver prints. In the paper-room the assistants are busy dividing the paper; and in a cellar-like space we find the Woodburytype department, where twenty presses are at work. In the evening all the pictures printed in the course of the day are developed in a special room. Here we find fifteen large water-tanks eight or ten feet long, three or four feet wide, and one foot deep, round the interior of which steam-conducting pipes for warming them are placed. At one end of the place they begin by spreading out the pictures and squeegeeing, then laying them out and sponging them to draw them off, and developing them as fast as two men can apply the squeegee. This goes on with what almost appears fabulous simplicity and ease, so that in a short time the series of tanks are soon full of floating pictures. When the pictures have made the tour of the various tanks they are removed to a special room and dried at a temperature of 20° R.

The paper is sensitised in the usual way, but not too strongly pressed. It is dried at a temperature of about 15° R., as it is important that it should not dry too quickly—ten or twelve hours being the best time. In the evening a supply for a whole week, or even longer, can be sensitised, and next morning the whole will be dry. The paper keeps for two months, but if exposed then one should not be much more than two days before developing. As for its permanency, entire piles which have lain since 1867 show no trace of change.

During the last few years numerous complaints have been made by Austrian photographers of the stringency of the laws relating to the sale of poisons, the rigour with which they are enforced, and the consequent difficulty experienced in obtaining a sufficient supply of those numerous chemicals indispensable to the photographer which happen to be poisonous. Photographers were by no means the only class on whom these regulations pressed hardly—they were felt to be most oppressive by scientific men and manufacturers; but at length, by dint of repeated representations on the part of the Vienna Photographic Society, the Vienna Chamber of Commerce, and various learned bodies, Government has been induced to relax the rules, and the Minister of Commerce has recently issued a new law. Formerly a chemist or druggist in Vienna dared not sell any considerable quantity of poison—for example, a pound of arsenic acid—to a professor of chemistry in Vienna, however well known to him personally the latter might be, without a formal permit. This regulation was intended to prevent the sale of poisons to persons ignorant of their deadly properties, and it was not open to the chemist to infer that his friend the professor possessed the requisite knowledge. And even when the formal permit had been obtained, there were still some further troublesome formalities and signatures required before the transfer could legally take place. By the new law poisons may be furnished to all scientific institutions and colleges without a special permit, the purchase being simply recorded, as in this country, in a book kept for the purpose by the chemist. Other persons—such as our friends the photographers—may obtain the poisons required in their business, and, at the same time, steer clear of the police, by providing themselves with a license, renewable every three years, on which the poisons required are mentioned. For the purchase, on a single occasion, of a quantity of a poison other than those mentioned in the license a special permit is required, similar to the permit required in this country before a quantity of spirits, &c., can be removed from a wine-merchant's store. No stamp nor duty is payable for the license or permit, but the particulars of the license or permit held by the buyer must be entered in the seller's book at the date of sale.

In the case of small quantities of poisonous drugs or medicines sold by druggists the rules are not unlike those in force in this country, though somewhat more strict. As in this country, all sales must be recorded, and the word "poison" must be conspicuously printed upon the label attached to all bottles or packets. An alternative to this latter rule, which is ingeniously devised and generally adopted, to appeal to those who cannot read, is that instead of, or in addition to, the word "poison," a death's head should be printed on the label. In view of the carelessness with which bottles containing poisons are often confounded with others containing harmless mixtures, it might be worth while to borrow the idea of the death's head.

SCIENTIFIC JOTTINGS.

PHOTOGRAPHY is of such far-reaching interest that it includes within its purview many facts of chemistry and physics which cannot always be included in the usual channels of intercourse between ourselves and our readers, and thus we find ourselves precluded at times from conveying to them many little items of intelligence regarding the chemicals used in our art-science, and also sundry details of chemical lore and of physical phenomena, which could be made available in the general store of knowledge a photographer should possess. It is, therefore, our intention in this part of the Journal to include from time to time a summary of such information as, published in the scientific literature of the day, we think likely to interest or inform our readers.

FOR the last year or two Mr. Warren De la Rue, in conjunction with Mr. Spottiswoode, has been making a series of interesting experiments with a gradually-increasing series of elements whose chief interest centres in the employment of chloride of silver as the electrolyte. Starting with a thousand cells he has increased the number to over five thousand, and has published some remarkable facts in connection therewith. It is not impossible that, some day, chloride of silver may play the part of light-producer in addition to its usual well-known *rôle*. The experimentalists named estimate that 100,000 of these batteries would give a spark in air of nearly three yards.

The haloids in one form or another have received a good deal of attention of late. *Apropos* of our remarks on chemical affinity some time ago we may note a contribution on this subject, by A. Potilizin

(*Deut. Chem. Ges.*), on the action of bromine on certain chlorides. He found that when a molecule of chloride of lead, for instance, was acted upon by bromine the amount of chlorine displaced was governed by the quantity of bromine present above the equivalent value—1, 4, 9, and 16 molecules displacing 10, 21, 29, and 39 per cent. respectively. This element has been used lately with success as a means for extracting gold from pyrites, and has been brought before the chemical public as a useful substitute in the laboratory, in the majority of cases, for chlorine when dissolved in water, which takes up of it four times as much as of the latter haloid.

In the form of bromide of potassium it is now imported into the country in immense quantities, the last five years having seen the supply at last far outstrip the demand. Seven or eight years ago America—which now produces it most largely, chiefly from the mother-liquor in salt works—was represented by a total of 10,000 lbs.; its production a couple of years ago reached the enormous weight of 176,000 lbs. The inevitable consequence is a great depreciation in its price, which is only about one-fourth of that obtainable for potassium iodide. Another unpleasant consequence is the temptation offered to adulterate the latter salt by the lower-priced bromide. We believe it is practised to a considerable extent, mostly in foreign samples. E. Biltz, in his own practice, tests the potassium iodide by precipitating an ammoniacal solution by nitrate of silver solution, chloride and bromide being left in solution. Excess of nitric acid will then produce a cloudiness in the solution if either of the latter be present, they being separated by any of the usual methods. We shall dismiss our notice of this group by simply *naming* a combination formed by the action of bromine and albumenised substances, viz., bromodioxyleucin-ammonia-bromotyrosinic acid!

Albumen, too, has had its share of notice from the chemists lately. Our readers will remember a series of interesting investigations closely worked out by an able contributor—now, alas! gone over to "the majority"—relative to the molecular weight of albumen. The same point has been taken up by Knop and Fittig, the former assigning a formula four times larger than the latter, just double what he would give to casein—a substance deserving more attention than it obtains—which he places as $C_{32}\ H_{50}\ N_8\ O_{10}$. A. Heynsius has produced from either seralbumen or ovalbumen various compounds with acid, or alkalies, or alkaline earths, and his paper throws much light on various photographic troubles with albumen. The compound with alkaline earths is soluble in water; a slight elevation of temperature precipitates the albumen uncoagulated, while a still increased temperature sends it down coagulated. Neutral salts, also, interfere with the coagulability. Graham, the late Master of the Mint, observed that albumen could be freed from chloride of sodium by dialysis. His results have been verified by Schmidt and Armstein, who also have stated that boiling will not coagulate albumen so treated, though its usual properties are restored upon the addition of salt, *i.e.*, sodium chloride. This non-coagulability has been explained by assuming the albumen to be alkaline, as acidification has a similar action to replacement of the sodium chloride.

Various forms of alum have formed a subject for investigation. A fact which may have an important bearing on carbon printing has been ascertained, namely, that upon heating a solution to 100° C. it decomposes (the product being a white precipitate formed of an amorphous powder and glittering scales). The more dilute the solution the more quickly decomposition takes place.

A test for ether has been published, which consists in mixing it with ordinary methyl alcohol in the proportion of ten of the former to four of the latter; upon mixing with water it remains transparent at a low temperature, but turbid at a higher, gradually resolving itself into two layers.

In the *American Journal of Pharmacy* will be seen an account of some experiments with tannin. It has been found not to give any precipitate with gelatine when it is first dissolved with glycerine.

Recent chemical investigations seem to have included the whole range of photographic materials, and, in addition to those already named, we find our notes call attention to a mode of purifying the most useful material for dissolving india-rubber—carbon disulphide. In the state most commonly presented it possesses such an intensely fœtid odour as to make its use unbearable; the new process promises a product in a very pure condition. The method of purification consists in mixing fuming nitric acid with a sample of the disulphide distilled off palm oil, and then adding distilled water, filtering, and distilling between 50° and 60°. A peculiar violet compound produced at one part of the process has been traced to the iodine well known to be almost always contained in commercial nitric acid.

The alkaline sulphocyanates have met with but little acceptance from photographers; those who still have any of it on their shelves may be able to use it as a test for old toning solutions to ascertain whether any gold remains or not, an orange-coloured turbidity, or precipitate, destroyed upon heating, being produced upon mixing sodio-auric chloride with these sulphocyanates.

Kaolin is now supposed to be produced by the mechanical decomposition of mica, some recent microscopical and chemical examinations having afforded evidence all tending in that direction. Several samples also were washed and so separated into large and small particles, but in no case could any chemical difference be discerned.

A mixture very similar to sensitised pigment for carbon printing, but without the colour, makes a splendid waterproof glue. The best proportions are—

Water	100 parts.
Glue	7 or 8 ,,
Bichromate of potash	$1\frac{1}{2}$ part.

After application in the usual manner it requires to be exposed to sunlight to develope its water-resisting capacities.

Formic acid never had much favour accorded to it. To some extent this may be explained by the difficulty originally experienced in obtaining it pure. For some time past, however, a much purer product has been easily obtainable. Now we notice still another process for obtaining it in the crystalline form from oxalic acid and mannite.

We conclude our notes by calling attention to the future possibilities of a new photographic agent—nitro-cumic acid. Exposed to light it rapidly alters to a deep red colour. A solution of the substance exposed to light deposited red amorphous flocks of an acid nature, soluble to a beautiful rich red liquid in alkaline solutions. By the action of reducing agents it yields a yellowish-brown powder, which readily decomposes, whilst oxidising agents convert the red acid into a yellow powder.

Meetings of Societies.

BERLIN PHOTOGRAPHIC SOCIETY.

An ordinary meeting of this Society was held on the 19th May, when the chair was taken by Herr Prümm, in the absence of Dr. Vogel at Philadelphia.

The first subject discussed was Herr Hommel's plastophotography, which was introduced by the Chairman reading a letter from M. Denier, of St. Petersburg, in which the latter said the process in question could not be the same as his, as he had never explained his process to anyone. Herr Hommel's circular was then read, in which he protested that his invention was an absolute novelty—a claim which was speedily and effectually demolished by the reading of an extract from the *Photographisches Correspondenz* of January, 1874. In the passage cited Dr. Hornig mentioned that a patent had been taken out in the United States, by a Mr. Kirk, for a process in which the necessity for retouching was done away with by taking a negative on both sides of the glass simultaneously.

Herr Roloff said he had made the experiment of taking such a double nagative, but that the highest lights only were visible in the auxiliary negative, and that the latter had as good as no influence on the print, which could not be distinguished from that printed from an ordinary negative taken on the other end of the same plate of glass.

Herr Liebmann's experience had been similar.

Herr Quidde thought that a thin collodion, which would allow the rays of light to pass through the glass and form the negative at the back, should have been used.

Two admirably-lighted portraits, sent by Herr Schüren, Court Photographer to the King of Siam, as a contribution to the "Wander-album," were handed round and duly admired.

The Secretary (Herr Quidde) then read an article by Herr Richard, jun., containing an account of Herr Braun's establishment at Dornach, and in which, forgetting the proverb that "comparisons are odious," he places the carbon tissue of this firm in favourable contrast with that of the Autotype Company. He says:—

"Braun's papers distinguish themselves above all others by their brilliant, soft, transparent tone, and both the single and double transfer papers have more gloss and less body than those of the Autotype Company. His papers require a somewhat longer exposure but develope more quickly, are more plastic, and have a greater delicacy of tone than those of the latter company. Thus, when Herr Braun's paper has been placed under water, it can be developed in a couple of minutes after the application of the squeegee, but it may also be allowed to lie without taking any harm for ten or twelve minutes. The papers are very pliable and hold quickly and easily, so that the squeegee may be applied, without danger, directly to the wrong side of the paper; consequently, the waterproof india-rubber squeegee-cloth may be dispensed with. Herr Braun thinks that the net-like marks that sometimes show on the Autotype Company's tissue are in the paper itself, and I am of the same opinion."

Herr Schaarwächter could not agree with the praise bestowed on Herr Braun's tissue at the expense of that of the Autotype Company. He found, on the contrary, that it had not such a good tone as the English tissue, and, as regards sensitising, developing, &c., he had not found that the Autotype Company's paper offered greater difficulties than Braun's.

Herr Prümm showed, from the respective price lists, that Braun's paper was dearer, not cheaper, than the Autotype Company's. As to its requiring a somewhat longer exposure, he did not consider that a very great drawback in the case of ordinary pictures, as it increased the control one had over them, and, after all, they print fast enough; but, on the other hand, he thought that for transparencies the Autotype

Company's paper took quite long enough to print, and that a longer exposure might be injurious.

Herr LINDE said that in his time he had got some 4,000 carbon portraits of the Pope from Herr Braun, many of which had an unpleasant, greenish-yellow colour. He wished to know whether it was possible that the colour of carbon pictures changed with time.

Herr PRÜMM replied that the black indian ink used for the carbon tissue was considered unchangeable, but that to get certain tones other colouring matter was mixed with it, and these might not be stable. He then laid upon the table a collection of pictures produced by a variety of photo-mechanical processes, amongst which were photolithographs and photozincographs, by Herr Carl Haack, of Vienna; heliolithographs, by Herr Falk, of Berlin; microphotographs, by Dr. Stein, of Frankfort, reproduced in lichtdruck by a Schnell press, at the rate of from 10,000 to 12,000 copies a day, by Herren Brauneck and Maier, of Mainz, &c., &c. He (Herr Prümm) then communicated the result of some experiments on the warping of albumenised paper in water which he had made, following up Herr Lindner's observations. In order to be sure of his conclusions he had continued his observations for three days, and the results obtained coincided perfectly with those previously obtained by Herr Lindner. The material employed was brilliant or double albumenised paper. Measuring the paper the long way of the quire there was neither expansion nor contraction caused by the toning, fixing, or washing. Measured in the other direction there was an expansion of three or four per cent.—about fifteen to twenty millimètres on the sheet when the paper was wet—but on being dried it contracted again to its original size. On being pasted the picture again expanded in the same direction, and, indeed, reached the same degree of expansion (three or four per cent.) as soon as the moisture had sunk into the paper. This takes place most easily when the pictures are damped some time before being pasted, then coated with paste, and allowed to lie in that state before being mounted. There is least expansion when the dry paper has gelatine brushed over it, and is then immediately mounted. He (Herr Prümm) thought that when a large quantity of the same subject was required it would be well to observe in printing to cut all the paper required the same way of the sheet.

Herr MAROWSKY had, in consequence of Herr Lindner's communication, also measured several of his pictures mounted and unmounted, but had found the expansion almost imperceptible—scarcely one millimètre in a sheet—but he did not damp his pictures before mounting them.

Herr O. LINDNER remarked that he went to work the opposite way. His pictures were trimmed to the proper size before being toned; then they were taken wet, as they came out of the washing water, brushed over with paste, and mounted. This procedure might be the cause of the very considerable expansion observable in his pictures.

Herr FECHNER asked whether the sort of paste used had any influence upon the degree of expansion, but no one had experimented in that direction.

A discussion upon the copyright law which followed concluded the proceedings.

Correspondence.

JULY MEETING OF THE PHOTOGRAPHIC SOCIETY OF FRANCE: A STEREOSCOPIC SLIDE; MR. GEORGE HARE'S AUTOMATIC CHANGING-BOX; M. HERMAGIS ON HIS PHOTOMETER "à PRISME."—A NEW MEANS TO LAY DUST.—AN ARTIFICIAL BREATHING APPARATUS.

THE Photographic Society of France held its general meeting on Friday evening last, the 7th inst.,—M. Davanne in the chair.

Among the divers presentations made to the Society was a stereoscopic hand stand. I call it a "hand stand," because it is intended to be held in the hand in order to examine the view. The instrument is very light, being composed only of a thin, flat rule, on which slides another piece of wood, of a cross-like shape, which holds the proof, and which can be drawn backwards and forwards to obtain the proper focus.* By some simple mechanism the two lenses can be placed—so as to have the true relief of the object—from two and a-half to three inches apart. The apparatus is ingenious and very light, but I think it will not replace the stereoscopes now in the market; for, when such an apparatus is purchased, not only is it bought as a scientific instrument, but as an ornament to the drawing-room table. This hand stand does not accomplish that purpose.

I then had the honour to present to the Society the patent automatic changing-box of Mr. George Hare, of London. I need not describe this apparatus, it being already well known to the readers of THE BRITISH JOURNAL OF PHOTOGRAPHY. I need but add that the members were very much interested in its construction, admired its automatic motion, and complimented the maker on the success he had attained in making so very necessary an instrument in such a manner that the risk of losing the plates by error, or by a prying disposition on the part of others, is now scarcely possible.

I am not only happy to inform my readers, but also the English inventors and makers in general, that the Photographic Society of France, being a society of scientific men formed for the advancement of photographic knowledge, and having that object constantly in view, are only too happy to receive from abroad as well as from home any communication or presentation likely to further the ends they seek to promote in so disinterested a manner. The readers of THE BRITISH JOURNAL OF PHOTOGRAPHY will always find me ready and willing to forward their interests. I only ask for a letter of introduction from Mr. Taylor, the Managing Editor of that Journal, which will be a guarantee of the interest or value attaching to the inventions to be presented by me to the Photographic Society of France; but, above all, this precaution is adopted to prevent loss of time on inventions not likely to become useful in connection with photography.

M. Fleury Hermagis, the celebrated optician, made several presentations to the Society:—1. A new portable camera stand. 2. A collection of three coloured glasses to be inserted in a lens for M. Ducas de Hauron's photochromic process. 3. A communication on the manner of employing his new photometer "*à prisme.*" I here recal my readers' attention to the description of this little instrument in THE BRITISH JOURNAL OF PHOTOGRAPHY (No. 815), December 17, 1875, page 610. As it has proved of service to many tourists and professional photographers it will not be a waste of time to refer to it again in these pages. M. Hermagis made his communication in the following terms:—

"Our photometer consists of a prism of yellow glass divided into nine bands of unequal thickness. The lines of the divisions with the corresponding numbers are deeply engraven into the glass and filled with black, so that they can be easily distinguished upon the sensitised paper, gradually becoming feebler in tone as the thickness of the yellow glass prevents the light from passing through. With this photometer no risk has to be run, as in other photometers, of the sun having an influence on the strips of mica or on the bands of paper. The action of the light is always the same. The most elementary notions of the use of a photometer being at present only known to a few, it is necessary to say that no photometer in existence can indicate immediately the time required for the exposure of a dry plate, the focus and diaphragm of a lens, together with the colour of the object, being given. Our photometer, like others, only permits us to find the exact time of exposure (notwithstanding the change of lighting which may have taken place) by giving the equivalent of the actinic action inscribed by the photometer the preceding day—the same lens, dry plate, &c., being employed. Thus, if a dry plate be exposed say two minutes at any time of the day, and the proof be found good, then a piece of albumenised paper prepared with chloride of silver be introduced into the photometer and exposed exactly the same time, and on examination it be found that all the numbers are visible with the exception of 8 and 9, it is easy to infer, upon a subsequent occasion, that if the photometer in two minutes indidicates only No. 4 the light is feeble, and that double the time is required for exposure; or the dry plate can be exposed without calculation by leaving the cap of the lens open until the tint is distinct, as in the first operation."

M. Fleury Hermagis then gave several other modes of employing the instrument, which practice will immediately suggest to the amateur or artist who employs it. I myself have succeeded very well, and can recommend a trial. It is the most simple and, at the same time, the cheapest photometer I know of.

The Chairman then read a list of the awards made by the jury in connection with the last photographic exhibition in Paris.

Photographers are very much annoyed during the summer months with dust from their floors, court-yards, gardens, &c. To put an end to this inconvenience it is sufficient to water the floors, &c., with a weak solution of chloride of calcium. The hydrometric qualities of this salt are well known. This system of watering has been carried on with success in Rouen, and will, very soon, be begun on a large scale in Paris for watering the streets and public promenades with a saving of seventy-five per cent.

Nothing scientific and of use to humanity is out of its place in a photographic journal; therefore I inform my readers, if peradventure it may be of service to any, of a new invention lately introduced by a French doctor, which is that of an artificial breathing machine. This apparatus has already been of great service in the restoration of many supposed drowned persons to life after all other hope had vanished. The apparatus is composed of a large sheet-iron cylinder, about two yards long by a foot and a-half wide. The drowned person is put into it, and the top, to which is attached an india-rubber apparatus to encircle the neck of the patient, is put on. A pneumatic pump is then set in motion, the

* The stereoscope in question is well known to our readers as the American stereoscope invented by Oliver Wendell Holmes.—EDS.

chest of the person rises, and air enters the lungs. The movement of the pump is then changed, and air is forced into the cylinder, the pressure of which drives the air out of the lungs. This artificial form of breathing is continued until life appears, or until it is perfectly certain that death will not relinquish its hold of its prey.

3, *Place Bréda, Paris, July* 11, 1876. E. STEBBING, *Prof.*

PHOTOGRAPHY IN AMERICA.

To the EDITORS.

GENTLEMEN,—In your issue for June 30th a correspondent in America, writing concerning the photographers there, says that "if they *do* blow a little occasionally they are amply justified in doing so." That, too, is the conclusion at which I arrived during a visit of six weeks recently paid to the United States, in the course of which I visited the studios of many leading photographers, and saw what I consider to be fair representative work.

At the Photographic Hall, in the centennial grounds, I was sorry to see England so badly represented. I may say that in portraiture America is far ahead of us. No doubt the clear, steady actinic light will account for some portion of this success, but not for the artistic feeling displayed in the work of many American photographers.

It pleased me much to see some beautiful, clean, large negatives by Sarony, of New York, and by Gutekunst, of Philadelphia. One large negative of a child, taken by the latter, I was told, had only twenty-five seconds' exposure. Such a negative would in England require three times that exposure.

The Centennial Photographic Company—Messrs. Notman, Fraser, and Wilson—are doing a flourishing trade. All the *employés* and season ticket holders are required to have their likenesses attached to their passes for recognition. I believe that the above-named firm took upwards of 10,000 portraits in ten days, at one dollar each, for that purpose. Of course a large staff of assistants is required to execute such quantities of work; besides which they have a number of assistants photographing the grounds and objects.

I would strongly recommend your readers to visit the United States this year. They will find much in and out of photography to interest them. No trade jealousy seems to exist—at least between European and American photographers. It was, as I was told, "open sesame" everywhere.

I should have liked to prolong my visit; but business at home and the intense heat (101° in the shade) compelled me to curtail one of the most invigorating and glorious "outings" conceivable. I may add that the best time to visit America is in September and October. Should any of your readers require any suggestions, or hints concerning expense, &c., I will be pleased to afford the desired information.—I am, yours, &c., A. L. HENDERSON.

49, *King William-street, London, July* 12, 1876.

P.S.—*Apropos* of carbon work: I scarcely saw any. This is accounted for by the fact that it won't work in the American climate; neither will the Woodbury process. I had the good fortune to meet M. Lambert in Philadelphia. He had prepared a quantity of tissue at night, hung it up to dry, but by morning it had all run.—A. L. H.

KEEPING QUALITIES OF "FRANKLIN" PLATES.

To the EDITORS.

GENTLEMEN,—With reference to my letter published last week in your Journal I would add that some "Franklin" plates prepared shortly after his formula was published, and which then worked well, now fog badly on pouring on the developer. As I have said, the fog is not equal over the whole of the plate; the edges are comparatively free from it, the effect being somewhat blotchy. I am inclined to think that it will be found that gelatine plates prepared with silver in excess do not keep well.

Has "Franklin" now in his possession plates prepared by his formula at about the time the latter was published? If so, are they as good as ever?

Several processes, which include excess of silver as a *sine quâ non*, have been found to yield plates which do not develope clearly after a few weeks.—I am, yours, &c., HERBERT B. BERKELEY.

Cotheridge Court, Worcester, July 11, 1876.

COLLOCINE.

To the EDITORS.

GENTLEMEN,—In reply to Mr. E. Dunmore's article in your last issue, permit me to say that I find that he has misstated altogether what I said in my last paper, read before the South London Photographic Society. His remarks on the matter read that I use a larger quantity of collocine than Mr. M. Carey Lea, whereas I use a far less quantity. Mr. Lea recommends one drop to three ounces of solution, but I recommend one *small* drop to every five or ten ounces.

Now, upon the subject of hardness of the negatives, I can with confidence contradict that; the results, in my hands, are quite the opposite. Mr. Dunmore must also bear in mind that collocine is *not* gelatine, although made from gelatine.

The discussion Mr. Dunmore mentions he took part in was at the May meeting of the Society, when I was unavoidably absent; but at the June meeting, when I brought the matter before the Society again, it is a great pity Mr. Dunmore did not make the same statement he made in my absence; therefore, I must attach very little importance to his remarks in your last issue.—I am, yours, &c., W. BROOKS.

9, *Stratford Green, E., July* 12, 1876.

THE EDINBURGH MEDAL AWARDS.

To the EDITORS.

GENTLEMEN,—The last number of your Journal has just reached me. Unless you are indulging in a joke at the expense of the eleven gentlemen who met with such a crushing defeat at our last special meeting, surely to be credited with "noble and chivalric generosity," "sublime self-abnegation, charming and edifying as it is rare," "an honour to the society to which they belong," must be more than compensation for being deprived of the powers of excluding those in this city, who wished to do so, from competing for prizes at the coming exhibition. If serious, though, I find it difficult to believe you are not speaking in bitter irony. Will you allow me, an amateur, who knows nothing, and desires to know nothing, of the unfortunate differences which have of late arisen in the society to give you my reasons for not being able to quite appreciate the honour of being associated with this "noble and chivalric" minority?

The first intimation I had of what was going on was the notice received late on the Saturday before the last special meeting. On inquiry, I found that at the previous meeting the motion we were asked to reconsider had been carried by a majority of one by electing a new member—not by ballot, as provided for by the rules of the society—*and his voting the same evening.* Curious to know what possible reasons could be assigned for what appeared to me the most extraordinary proposal ever made to a photographic society, I went to the meeting, and attentively listened to Mr. Neilson. Imagine my surprise when I found, at the conclusion of a speech which most certainly contained but little of what he professes to give as the substance of it in your last number, he adduced only the following:—"Ill-feeling and jealousy are certain to arise, and fear lest some dishonest artist might send his negative to Berlin or Paris to be retouched, gain a prize, and thus obtain a prestige to which he was in no way entitled." I could not, until that evening, have believed that a knot of Scotchmen could have been found to come forward and crave to be heard in their own condemnation, and unblushingly proclaim to the world that, like children, they were so actuated by ill-feeling and jealousy towards each other they could not compete for prizes. I fancy I can see their blushes as they read of the "chivalric generosity" you assign as their motive. It requires a stretch of the imagination to which mine is wholly unequal to conceive men actuated by ill-feeling and jealousy being capable of "sublime self-abnegation" and "noble and chivalric generosity."

The argument regarding the Berlin or Paris retouching, unless Mr. Neilson claims a monopoly of dishonesty for photographers, amateur and professional, in Edinburgh, may be good for giving no prizes at all; but if he believe, as doubtless he does, in the possibility of such dishonesty outside of it what does it matter to him whether the dishonest photographer be a resident of Edinburgh or of Timbuctoo? The answer is, of course, obvious and well understood here—so well understood that, while his following had decreased at the last meeting from thirteen to eleven, had I but received notice earlier I alone could have obtained a dozen votes to swell what he sneeringly describes as the "well-drilled" majority. I further tell him that had he succeeded—so clearly were the motives of the minority seen through—the Academy's rooms would not have been available for the exhibition; and that, while they held out no unmanly threats of resigning, a considerable number of the members had resolved on doing so. Mr. Neilson's resignation, like his motion of expulsion, with which he threatened a member, is, I take it, still in the future.

More ill-feeling and jealousy have been caused by the manner in which this small minority has endeavoured, by surprise, to exclude resident photographers against, I venture to say, the wishes of nine-tenths of the society than would have been caused by competition for medals at ten exhibitions.—I am, yours, &c., A. WILLIAMSON.

15, *Moray-place, Edinburgh, July* 10, 1876.

[The above letter, which we print as received, puzzles us in no small degree. Knowing something of the matter-of-fact solidity of the Scottish character we are not a little amazed at re-reading our recent observations by such an intensely strong light of imagination as that now poured upon them from the northern capital by Mr. Williamson. This gentleman must, we suspect, have been made the victim of some practical joker; for we find sentiments and phraseology—given, too, within inverted commas as quotation marks—attributed by him to us, as occurring in our last number, of which we are just as profoundly ignorant as Mr. Williamson *appears* to be of what we really did write.—EDS.]

EXCHANGE COLUMN.

No charge is made for inserting these announcements; but in no case do we insert any article merely *offered for sale*, that being done at the small cost of one shilling in our advertising pages. This portion of our columns is devoted to exchanges only. It is imperative that the name of the person proposing the exchange be given (although not necessarily for publication, if a *nom de plume* be thought desirable), otherwise the notice will not appear.

A half-plate lens, in good condition, by Voigtlander, and a quarter-plate lens, by Cox, and balance in cash, in exchange for a 1B long Dallmeyer.—Address, J. K, 24, Queen-street, Whitehaven.

A *Carte* or cabinet burnisher and half-plate camera wanted in exchange for a pair of compound stereo. portrait lenses, by Cox.—Address, E. J. Chesterman, Brocco Bank, Ecclesall-road, Sheffield.

A $25\frac{1}{2} \times 20\frac{1}{2}$ printing-frame, well made, with plate-glass front, offered for backgrounds, accessories, Weston burnisher, magic lantern, or anything useful.—Address, J. P. Procter, 289, Rochdale-road, Manchester.

ANSWERS TO CORRESPONDENTS.

☞ *Correspondents should never write on both sides of the paper.*

Notice.—Each correspondent is required to enclose his name and address, although not necessarily for publication. Communications may, when thought desirable, appear under a *nom de plume* as hitherto, or, by preference, under three letters of the alphabet. Such signatures as "Constant Reader," "Subscriber," &c., should be avoided. Correspondents not conforming to this rule will therefore understand the reason for the omission of their communications.

A. Marschall.—The prints have not yet arrived.

R. E.—Mr W. J. Stillman has again gone to the East as war correspondent for *The Times*.

J. K.—The bromide emulsion ought not to have deposited such a precipitate. It must be kept in the dark.

C. G.—The spots in the negative are due to the action of the atmosphere upon the metallic silver of which the image is composed. By varnishing the plate soon after the film has been dried, you will cease to be thus troubled.

G. B. D.—Let the tent cover be formed of india-rubber cloth. Excellent thin samples may be obtained quite suitable for the purpose; but we strongly advise you not to use the thinnest procurable, as it is liable to become full of minute pinholes.

One in the Dark.—If you submit one of the prints for our examination we may then be able to give you some information concerning the mode of their production. Until you do this, we shall remain quite as much "in the dark" as yourself.

J. D. Lysaght.—The specimens enclosed, obtained by the formula of Mr. King, attest the great success you have achieved in working the gelatino-bromide process according to his directions. The instantaneous view of the sheep would prove invaluable to an artist as a study.

Medicus.—To cement the glass tube in the brass socket apply a mixture of resin and brickdust (equal parts) to which is added a little red ochre. This forms an exceedingly strong cement; but, to ensure its adhesion, both the socket and the end of the tube must be heated to such a degree that the cement will melt when applied to either.

Photos.—The system of lighting you purpose adopting is one by which you secure the admission of light under the best possible circumstances. We need scarcely advise you to have the sash-bars as thin as possible; what you will lose in strength from their thinness can be made up by their depth, for, owing to their disposition they may be made very deep without interfering with the amount of light that falls upon the sitter.

Psycho.—We are quite well aware of all that has recently been transpiring in relation to odic photography, and we have in our possession several photographs of the "magnetic flames." But the experiments that have been made to establish the various conditions under which such photographs can be obtained are still in too incomplete a state to warrant us in writing on the subject. If you call at our office we shall show you four or five specimens of this kind of photography.

H. A. J.—We, too, were recently similarly much troubled with the prolific crop of oyster-shell markings which appeared when using a certain kind of collodion; but we got rid of them altogether by lifting the plate out of the sensitising bath and transferring it to a very weak solution of nitrate of silver—about six grains to the ounce—kept in another vessel, and after half a minute or thereabouts lifting it out and draining it well previous to placing it in the slide.

Edina.—A stereoscopic effect cannot possibly be obtained by mounting, side by side, two views printed from the same negative. But a certain kind of stereoscopic effect may be secured if prints obtained in that manner be so carefully trimmed that when mounted side by side the subject appears to be projected far beyond the mount. It then seems as if the landscape were being examined through a large aperture, such as a window. This, it must be observed, is not true stereoscopic effect, because the visual relation of one plane to another is similar in both pictures; but, owing to the eye or the brain of the unthinking observer being a little "bamboozled" by the different planes upon which the mount and the pictures are apparently situated, the picture is sometimes apt to be accepted as one possessing genuine binocular relief.

Omega.—Your query does not betray the fact announced by you—that you have been a diligent reader of photographic serial literature—otherwise you would have been conversant with the reason why alkaline development is preferred for dry plates. However, we answer your query in the brief manner you desire that it should be done. By alkaline development a good negative may be obtained by an exposure which would have to be quadrupled if, instead, an acid development were employed.

Lux (Paris).—We have examined your attempts at photo-micrography with much interest, and quite sympathise with you in your distress in being unable to obtain the sharpness perceivable in the works of the gentleman named. Your object-glass, we have no doubt, is one of a high class; but, although it may show very clearly all the test-objects named, it will not produce good photographs of them until it is subjected to an alteration the nature and extent of which can be understood from the following:—A photographic lens is corrected in such a manner as to bring to a focus both the yellow and actinic rays. The correction best adapted for a microscopic objective is that which groups together all the luminous rays, only leaving uncared for those which are actinic; and hence the non-coincidence of the luminous and the photographic foci. A good remedy—if not *the best*—for such non-coincidence will be found in fitting a supplementary lens, made of a spectacle glass of six or eight inches in focus, into the posterior end of the object-glass, and this lens, which is uncorrected for colour in itself, will balance the over-correction of the objective, causing it to work to focus. Although we have given six or eight inches as the focus of the plain lens, it should be added that one either stronger or weaker than this may be required; but the proper degree of strength can readily be determined after two or three trials. We never heard of one of less focus than four inches or longer focus than twelve inches having been required to effect the photographic correction of a good microscopic objective, no matter by whom manufactured or what the length of its focus.

☞ Editorial Communications should be addressed to "THE EDITORS"—Advertisements and Business Letters to "THE PUBLISHER"—at the Offices, 2, York Street, Covent Garden, London, W.C.

A Serious Case Against a Photographer.—At the recent Assizes held at Aylesbury, Richard Hill, the manager to a photographic firm at Eton, was charged with violating, at the place of business of his employers, the person of Matilda Neighbour, aged 15, a servant girl in his own employment. The interest of the case depended upon the good character borne by all the parties concerned, and upon the position in life of the prisoner, which, it appeared, was very respectable. The jury found a verdict of "Guilty," accompanied by a recommendation to mercy on account of the good character given in evidence. The sentence was five years' penal servitude.

Messrs. E. and H. T. Anthony and Co. and the Centennial Exhibition at Philadelphia.—In the May number of *Anthony's Bulletin* Messrs. E. and H. T. Anthony and Co. complain of the treatment they have received at the hands of the committee of the Philadelphia Centennial Exhibition. It appears that, after subscribing handsomely to the funds for erecting the Photographic Hall, they applied for space to exhibit—their application being granted, and a plan of their space promised. Unfortunately, however, after Messrs. Anthony had gone to considerable expense in forming a collection of their goods for exhibition and in constructing handsome show-cases in which to display them, it was discovered that the space allotted to them was not only inadequate, but was also scattered about in all directions; and, as the regulations could not be altered, Messrs. Anthony decided that, as they could not make a *creditable* display, it would be better to retire altogether. The show-cases are now erected at No. 591, Broadway, where visitors are invited to inspect them.

METEOROLOGICAL REPORT,

For the Week ending July 12, 1876.

Observations taken at 406, Strand, by J. H. Steward, Optician.

These Observations are Taken at 8 A.M.

July.	Bar.	Wind.	Wet Bulb.	Dry Bulb.	Max. Tem.	Min. Tem.	Remarks
6	30·04	W	59	65	76	60	Dull
7	29·83	W	60	67	79	61	Bright
8	29·76	W	62	67	74	61	Cloudy
10	30·02	W	55	56	71	54	Cloudy
11	30·18	NW	53	62	68	53	Cloudy
12	30·44	N	52	61	—	52	Hazy

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THE BRITISH

JOURNAL OF PHOTOGRAPHY.

No. 846. Vol. XXIII.—JULY 21, 1876.

ON THE EFFECT PRODUCED BY CERTAIN INORGANIC SUBSTANCES IN EMULSIONS.

During the last year or two many substances have been recommended to be added to the ordinary bromide emulsion for the purpose of conferring that most desirable combination of good qualites—sensitiveness with density. Such additions may be divided into two general classes, organic and inorganic, under the former of which heads are included such substances as nitro-glucose, lactic, malic, and oleic acids (the latter in the form of soap), and others too numerous to mention. Under the second heading may be mentioned various mineral acids, notably nitric, hydrochloric (singly and combined), and sulphuric; also caustic potash and its nitrite. It is our intention in this article to deal with the more recent of the already long list of such additions, namely, sulphuric acid, caustic potash, and nitrite of potash.

The principle involved in the use of the last-named class of substances differs essentially from the others. In the case of an organic substance the effect produced is generally understood to proceed from the formation directly, by the action of the silver nitrate upon the substance added, of an organic salt of silver capable of increasing the susceptibility of the haloid to actinic action, or of assisting in the subsequent process of development. Inorganic substances, on the other hand, while conducing, probably, to a similar result in the end, work indirectly by decomposition of the organic constituents of the emulsion, forming bye-products, which, in turn, enter into combination with the silver nitrate. With regard to nitro-glucose, however, about which so many different opinions have been expressed, it may be well to remark that we have a strong belief that it should be considered as a sort of hybrid, belonging, strictly speaking, to neither class. While in itself it is distinctly an organic substance, we are of opinion that its effect depends less upon its organic reactions than upon its natural proneness to decomposition, which tends to the formation of the same or similar bye-products as the various forms of inorganic matter.

Those of our readers who are conversant with what has recently been written concerning nitro-glucose will be aware that its efficacy is said to depend upon its being partly decomposed by long keeping in solution, or by subjecting it for some time to a high temperature. The change which takes place under such circumstances is, there can be no doubt, similar in kind to that which occurs in collodion by keeping, only that in the case of nitro-glucose the change is much more rapid and more decided. Those who have had experience with the substance in question cannot fail to have noticed the great difficulty in keeping it for any length of time in the solid state unless immersed in water, as, even when perfectly freed from all traces of the acids used in its manufacture, it rapidly changes, giving off large quantities of nitrous fumes, swelling and frothing up in the most extraordinary manner. Its solution, when carefully neutralised by means of chalk and filtered, also becomes acid in a few days and smells strongly of nitrous acid, and if kept in a corked bottle the cork soon becomes quite useless from corrosion. What the ultimate result of this decomposition may be we are unprepared to say; but it is evident that one effect produced by nitro-glucose when added to collodion is to introduce a certain quantity of nitrous acid, and hence, by contact with silver nitrate, the formation of silver *nitrite*.

From the earliest days of the collodion process silver nitrite has been credited with the property of yielding dense, clear images; hence it has been recommended to add it to the nitrate bath with that object. Experiment has placed this action almost beyond doubt, but various opinions have been expressed as to its effect upon sensitiveness. On the one hand it is alleged, and this is, we believe, the general idea, to be decidedly injurious in that respect, but, on the contrary, some assert that it exercises a beneficial influence, or at least produces no ill effect. However that may be, it has been recently suggested to utilise this salt in emulsion work for the purpose of increasing the density of the deposit. Amongst other methods of this description we may notice that of Mr. M. Carey Lea, who recommends the addition to the emulsion of a small quantity of a soluble metallic nitrite, preferably potassium. Several months ago we included this substance amongst others in a series of comparative trials, but did not then give sufficient attention to it personally to render the test a crucial one.

We have, however, more recently repeated our experiments, and find that under certain circumstances it proves decidedly beneficial as regards the quality of the resulting image, while its effect upon the exposure does not appear to be very decided either in accelerating or retarding the light's action, though, if we recollect rightly, Mr. Lea claims that it tends to greater rapidity as well as density. With a collodion giving a proper amount of density without extraneous aid of this description it seems to be entirely without effect of any sort, but when, from lack of age or unsuitable pyroxyline, the collodion is deficient in vigour it may be counted on as a useful adjunct.

Last year we published a reprint of a paper by Mr. Hardwich dealing with the preparation of collodion generally, in which the author spoke of the use of caustic potash as a density-producing agent under certain conditions. Though the remarks contained in that article referred solely to collodion for use with the bath we judged it not improbable that it might be beneficial when applied to emulsions. The *modus operandi* consists in treating the collodion with an alcoholic solution of caustic potash in very minute quantity, the result of which treatment is to set up a rather peculiar action. As noticed by Mr. Hardwich, the first effect is to render the collodion more glutinous, and we have found that, by adding a quantity considerably greater than that recommended by him, it is possible to almost solidify the collodion after a little time. We have been able to transform a collodion of the usual thickness into a gelatinous mass, just fluid enough to "find its own level," and, at the same time, cohesive enough to form a sort of jelly without adhering to the sides of the bottle. In an hour or two from this stage the whole was quite fluid and considerably thinner than before treatment with the potash. The quantity of alkali necessary to produce this result is, of course, much greater than could be used if the collodion is to retain its photographic properties, the experiment having been performed solely with a view of arriving at the maximum effect of the alkali. A somewhat similar result is produced by substituting a small piece of quicklime for the potash solution.

In our application of the potash treatment to an emulsion we prepared two collodions from samples of pyroxyline very different in character. The first was a good commercial sample which we employ in our ordinary work, and which gave a film of good body if dissolved in the proportion of five grains to the ounce of solvents; the second was much more soluble, and, weight for weight, gave a much thinner collodion than the other, while it required a considerable amount of intensification to work up to printing density. The two collodions were bromised according to the same formula, having been previously treated with potash. This was done by cautiously dropping in the alcoholic solution, commencing with the proportion of one drop to four ounces of collodion, until, after standing some time, silver nitrate produced a slightly discoloured precipitate from the formation of the oxide; a few drachms of plain collodion were then added in order to neutralise the excess of alkali, and, after allowing time for the collodion to "clear," it was bromised.

The results in both cases were very decided, but more especially with the inferior sample of cotton. First, with regard to the effect produced on the collodion itself: with both samples the result was primarily a thickening one, which afterwards disappeared to a greater or less extent, leaving collodion No. 1 a little thinner than at first, while the other had acquired greater viscidity. No palpable change occurred upon bromising; but upon the addition of silver nitrate both samples exhibited differences of behaviour when compared with similar emulsions not treated with potash. In the first place, the colour of the emulsion by transmitted light was considerably richer, possessing the peculiar ruby-tint so much desired in a good film, while the deposit was finer and the films freer from structure. In the case of the No. 2 pyroxyline the combination of the salts took place more slowly in the potash emulsion than in that not so treated, and the solution, when poured on to glass, had a brighter and more transparent appearance by transmitted light, and dried with a higher gloss.

Under the action of the developer the difference produced by the potash was no less marked. Sample No. 1 developed more vigorously, the image by reflected light appearing much clearer and denser on the first application of the solution, and acquiring strength more rapidly; indeed, it was found necessary to diminish the quantity of pyro. and to add the alkali more gradually than we are in the habit of doing, in order to avoid too great contrasts in the picture. The other sample, which under ordinary circumstances required prolonged treatment in order to give a dense image with the alkaline developer, now developed clean and vigorous by *reflected* light, but still left something to be desired as regards real printing density, though that was acquired by the exercise of a little care; it was at least greatly improved, though, perhaps, it should be remarked the pyroxyline was not a sample very suitable for use in emulsion work. It is worthy of notice that twenty-four hours after the addition of the potash neither sample of collodion exhibited an alkaline reaction to test-paper.

The last substance we shall mention is sulphuric acid, which was introduced by Colonel Stuart Wortley a few months ago. Much discussion has taken place as to the relative value of nitric and hydrochloric acids when employed for this purpose, and it might appear that any further consideration of the effects of the acids is unnecessary. In the case of sulphuric acid, however, this is not so, for a rather important point is laid open to investigation. In the paper read by Colonel Wortley before the Photographic Society of Great Britain, in which he detailed his experience with this acid, the author accounted for the gain in sensitiveness and density claimed by supposing the formation of sulphate of silver. Now the latter salt is one very rarely met with, and rather difficult of formation; moreover, it is not precipitated from aqueous solution of the nitrate by addition of either sulphuric acid or soluble sulphates. Why, then, should it be formed in an emulsion? If silver nitrate be dissolved in a mixture of ether and alcohol, or in collodion, instead of water, sulphuric acid produces a copious white precipitate, which may be the sulphate or, with equal probability, something else. It certainly has little of the outward appearance of that salt, being (to the unassisted eye at least) entirely devoid of crystalline structure; while the precipitate obtained from the ether-alcohol mixture, after solution in boiling water, fails to deposit, upon cooling, the characteristic needle-like crystals, in which form sulphate of silver is usually obtained.

When added drop by drop to plain collodion, the first effect is to produce a number of beads of gelatinised pyroxyline of a distinctly yellow colour, which redissolves with agitation. If a quantity be added at once, as in making the addition to a large quantity of collodion, the action is much more violent, effervescence taking place with evolution of nitrous fumes. As in the previous instance, agitation soon redissolves the precipitated cotton, but the acid collodion retains a permanently yellow tint. If the acid be added to the collodion after bromising (we speak now of our own experience with a collodion containing bromide of cadmium and ammonium) a very curious appearance ensues, the collodion acquiring a sort of opalescent or pearly turbidity, somewhat resembling an intimate mixture of oil and water before the minute globules of oil have had time to conglomerate and rise to the surface. This peculiarity entirely disappears upon sensitising, showing that it is in some way dependent upon the salts contained in the collodion.

The use of sulphuric acid adds greatly to the richness of the colour of the film by transmitted light—considerably more so than is the case with potash. The image when developed comes out clear and strong, with that peculiar bloom which tells in the early stage of development of a good negative. Our experiments were made with the same two samples of cotton spoken of above, the same formula being observed throughout, and the results, when compared with those obtained with the normal collodions, showed evidence of improvement. The inferior sample of cotton, indeed, when treated with one and a-half minim of acid to each ounce of collodion was so thoroughly changed in character as to leave very little further to be desired either as regards sensitiveness or quality of image. With the other sample the difference was less noticeable—possibly for the reason that there was less room for improvement; but the general effect seemed to be to bring out the shadows and feebly-lighted portions of the picture more vigorously, and to produce, with a given exposure, a more harmonious result.

Such are the practical effects produced by these various substances; and it will be noticed that, in spite of the difference in the composition of the agents employed, the results are very similar. It would be hazardous to assert positively that the ultimate effect is the same in all cases; but we are strongly of opinion that it is so—that, in fact, whether the agent employed be nitro-glucose, potash, or sulphuric acid the effect depends upon the formation of silver nitrite in the emulsion. At a future date we may be able to adduce further evidence in support of this view.

PHOTOLITHOGRAPHY.

In the absence of more details than have been given by Herr Märkl in his communication to the Vienna Photographic Society, and which will be found in another page, we cannot comprehend with absolute certainty the necessity for, or the special advantages of, the two films of which he speaks as being necessary in the production of photolithographs.

Recognising in albumen a better substance for converting into the sensitive layer than the gelatine which has been much recommended and much used by many practitioners, Herr Märkl appears to encounter a difficulty in connection with the employment of this medium of which we have never previously heard, namely, that which has been rendered by our translator as follows:—"With albumen paper we secured very delicate lines, but, owing to the paper being easily rubbed off, and the colour adhering where that happened, a clean background could not be secured." The remedy for this and other difficulties was found in giving the paper a preliminary coating of plain gelatine to act as a substratum for the albumen.

Now, while we are quite at one with the author of the paper in question as regards the advantages arising from the use of albumen as a medium for holding the bichromate of potash, instead of gum acacia, gum tragacanth, isinglass, or gelatine—which, as we have said, are much used—we are quite at issue with him respecting the

necessity for having a gelatinous substratum on the alleged grounds of the albumen stripping from off the paper when the image impressed upon it has been "set off" upon the lithographic stone.

We embrace this opportunity of describing a method of producing photolithographs in which is fulfilled both the conditions mentioned by Herr Märkl, and also others of not less importance, which we shall sum up as follows:—

The film must be so smooth as to register the finest line or dot of an engraving; it must be so slightly coloured as not to prevent the complete penetration of the light even from a feeble line in the negative; it must yield a transfer which shall adhere firmly to the stone when both are being passed through the press; and it must part readily with its ink to the stone or plate of zinc to which the transfer is to be made. In addition to all these it must be a film on which the picture may be easily developed by the solubility in cold water of the portions that have not been acted upon by light.

To prepare such a paper: take a sheet of ordinary albumenised paper as sold for silver printing, taking care to select one that is very smooth. We are now writing on the supposition of the photolithograph to be prepared being one of the finest class—such, for instance, as the reproduction of a fine line (steel) engraving. Having procured a flat tray made of tin, sheet iron, or even wood, fill it with boiling water, into which plunge rapidly the albumenised paper, allowing it to remain there for fifteen seconds. It is then transferred to a vessel of cold water. A similar course is to be pursued with all the sheets intended to be used, after which they are removed, one by one, from the water and placed between two folds of blotting-paper until surface dry. While this is being done a solution of albumen must have been prepared and poured into a flat bath formed of porcelain, glass, or other convenient material. To prepare this albumen: beat up to a froth the whites of as many eggs as may be required, and, after allowing this to liquefy—which it will do after being allowed to stand for a few hours—mix with it a saturated solution of bichromate of potash in the proportion of fifteen ounces to each pint of albumen. The mixture may be made by means of a wooden fork kept for this purpose; but one of the best kinds of apparatus for either effecting the mixture or for beating up the albumen at the preliminary stage is a cylinder formed of perforated zinc, having a wooden top through the centre of which projects the upper end of a piston rod, which, together with the piston belonging to it, must be formed of wood. This is placed in the vessel containing the albumenous mixture, and, by moving the piston up and down a few times, the mixture is completed in a most perfect manner. Almost equally as effective, if not entirely so, is a simple piece of apparatus devised by Mr. H. J. Burton a few years ago, which consists of a circular plate of tin attached, piston-like, to the end of a round rod. By means of scissors cuts are made from the margin to the centre of the tin, and each piece or blade thus formed receives a twist so as to place it like the fans or arms of a windmill. This is lowered into the solution, and by giving it a few turns it causes such a commotion in the fluid as to ensure perfect admixture in a brief period of time.

On the sensitising fluid thus prepared each sheet of moist paper is floated, face downwards, for a short time—say for ten or fifteen seconds. It is then raised rapidly and transferred immediately to the drying-room, where the temperature should be tolerably high. When dry it is very sensitive, and will receive a good impression in the printing-frame in from ten minutes upwards according to the intensity of the light.

The paper, on being removed from the printing-frame, is lightly smeared all over the surface with transfer ink thinned with turpentine. If the sheet be large the best way by which to apply the ink is by means of a stone which has been inked, and upon which the paper has been laid, and then passed two or three times through the press. For pictures or sheets of small dimensions the ink may be applied by means of a dabber made of wool covered with leather.

The next operation consists in placing the paper in a vessel of water. After remaining in this, face upwards, for one or two minutes, a soft sponge is passed lightly over the surface, and by means of gentle friction the whole of the ink is removed from the surface except that on the lines of the subject. Care and skill are required during this part of the process, otherwise the finest lines may get blocked up. Instead of a sponge a camel's-hair brush frequently proves sufficient to complete the development of the details.

A transfer prepared according to these directions will adhere so well to the stone as to allow of its being passed many times through the press without shifting its position, and each line of the resulting transfer will be clean and vigorous.

INSTANTANEOUS PHOTOGRAPHY.

No. II.

There is a charm about instantaneous photography—not so much in the actual results, so far as yet realised, as in the pleasant anticipation of the degree of excellence in this respect which may yet be attained—that has induced us to continue, at intervals, the experiments alluded to in our article on this subject last week. We then spoke of the three factors in the production of such pictures—the collodion, the bath, and the developer—and said nothing of the lens or the light, presuming that it would be understood that the latter must be of the highest actinic quality, and the former of the most rapid form obtainable. The experiments then mentioned were made with a quick-acting portrait combination, stopped down just sufficiently to give the required depth of focus. Since then, however, decidedly better results have been obtained by "rapid" cemented landscape combinations with full apertures, but confining the image to a considerably smaller size of plate than the lenses were intended to cover.

We tried first what could be done by modifying the development, still adhering to the thirty-five-grain solution of iron, which we had found to give more detail than a weaker solution. With one drop of collocine added to ten ounces of this we had no difficulty in obtaining an image full of the most minute detail in a very few seconds; but, when the solution was allowed to remain till the image acquired density, the result was in almost every case an unequal deposit of the reduced silver—that is, the high lights seemed to attract much more than their proportional share, leaving the lower tones correspondingly weaker.

This objectionable feature was, to a considerable extent, got over by allowing the developer to act just sufficiently long to fairly bring out the image, and then thoroughly washing it off. At this stage it looked very much like a weak gelatine negative, the highest light being perfectly transparent, but of a brown rather than a greenish colour. The well-washed image was then treated to a weak solution of chloride of gold, which was allowed to act until the detail was charmingly visible on the opposite side of the plate, and then washed off. A tolerably strong solution of iodide of mercury, made by adding a solution of bichloride of mercury to a solution of iodide of potassium as long as the precipitate was redissolved, was then applied, when the image rapidly acquired printing density, and was, generally at least, quite free from the objectionable hardness produced by several other methods of intensification that were tried.

The method of intensifying with the mercurial solution possesses one little drawback, which caused no little trouble at first. Although the image appeared sufficiently dense when finished the varnish appeared so to penetrate it that, after varnishing, it looked almost as thin as before intensification; but this difficulty was easily and completely overcome by a coating of a weak solution of gum arabic before the application of the varnish. It is just possible that by converting the image more fully into a chloride by any of the well-known methods, and the subsequent application of Schlippe's salt, a better and more stable result may be obtained.

Although, however, very fair negatives have been produced in this way, our friends are by no means satisfied that they are the best that can be secured, or that the material as used is the best for the purpose. Remembering the claims made by Mr. Elbert Anderson, of New York, on behalf of a twenty-five-grain bath and a collodion containing twelve or thirteen grains of iodides and bromides, they resolved to give the method a trial, but were stopped at the very threshold by their utter inability to get the film to retain the quantity

of silver iodide so formed in the film. We have again repeated the experiment, and have no hesitation in saying that with the cotton, solvents, and salts procurable in this country it cannot be effected. The formulæ of Mr. Black, of Boston, which includes a bath containing ten drops of nitric acid to the ounce, and for which an exalted degree of sensitiveness was claimed, was also tried, and with, in the main, better results. The image is produced in quite as short a time. It is weaker, and acquires density with greater difficulty, but remains cleaner and more beautiful by reflected light. Still the film has a great tendency to leave the glass, even when a substratum of albumen has been used; and on that account alone the modification cannot be recommended.

On the whole, we think ultimate success is more likely to be obtained by the arrangements described in our last number than by any of the modifications since tried, although we have hope of some advantage being derived from the use of the developing solution at a higher than the normal temperature. Some experiments made in that direction are very promising, a much denser and more easily-intensified image being obtained by plunging the plate into the solution heated to 110°, and contained in a flat dish. Of course this means a larger consumption of developing solution, although no more should be used than is sufficient to cover the plate; but iron and collocine are cheap, and one good instantaneous picture is of much value.

IN reply to the first portion of Mr. H. B. Berkeley's letter (which will be found in our correspondence columns) we can only repeat that that gentleman appears to misunderstand our meaning in the paragraph quoted from page 289. We certainly do consider that a beneficial change is brought about by the contact of the sensitive film with certain forms of organifiers; but we do not hold that that change lies in the direction of sensitiveness, nor have we stated so. We believe the effect of such treatment to be to increase the vigour of the image, to facilitate development, and to improve the quality of the deposit; and, such effect produced, the sensitiveness is heightened by the removal of the excess of organic matter, which acts more or less as a retardent if allowed to dry on the film. With regard to the next paragraph, perhaps our previous remarks at pages 278 and 329 were not very clearly expressed. What we intended to convey in the former case was that an emulsion prepared from silver bromide precipitated in the presence of excess of silver, previous to emulsification, is found to be less sensitive than one formed in the ordinary way with a slight excess of free bromide, in which case *the silver acts simultaneously upon the haloid and the collodion.* At page 329 we have misstated the case; the sentence referring to the precipitated bromide emulsion should read "is *less* easily impressed though *more* easily reduced," &c.; and in the ninth line from the end the word "less" should be substituted for "more." We wished to emphasise the fact that an emulsion in which the silver bromide is formed in the presence of the organic collodion is more rapid than one in which the bromide has been subjected to the action of the organic matter subsequent to its formation, and that notwithstanding the restraining effect of soluble bromide. The inorganic film of bromide is more easily reduced by the developer than the other; whence we may assume that the collodion compound acts as a "restrainer of development." These views are directly in accordance with the spirit of the two articles to which Mr. Berkeley has drawn our attention.

ORGANIC SALTS OF SILVER IN PRINTING PAPER.

IN my communication to you of May 19th, *On the Fading of Silver Prints*, I did not intend to claim having discovered the existence of a silver salt in sensitised albumenised paper; that was not already known. I did not know whether it was or not, never having heard of Mr. Spiller's demonstrations ten years ago, and I am still ignorant who first called attention to it; but, whoever it was, to him be all the honour. It does exist, and I would again suggest that a solvent should be sought for it that will not destroy the print. It does not appear to be a chloride, carbonate, phosphate, or sulphate, as all these should be soluble in hyposulphite of soda or hot ammonia.

The following experiments were undertaken with a view to determine whether the combination takes place with the albumen only, or with impurities in the paper, size, or salt, or is due to a compound of silver formed in the fixing bath.

Some perfectly-fresh albumen was beaten up into a stiff froth, allowed to settle, and filtered; it was then divided into two parts. One part was salted with pure chloride of sodium; the other unsalted. Several pieces of plain Saxe paper and glass were coated with both and dried, carefully marked, and sensitised. A part of each was fixed in a strong solution of hyposulphite of soda, and another part in a similar solution of soda but having a strong solution of carbonate of ammonia added, and the rest fixed in strong liquid ammonia. All these operations were conducted in artificial light.

The different samples were thoroughly washed and applied moist to the mouth of a bottle containing a saturated solution of sulphuretted hydrogen, and also tested by sulphide of ammonium as directed by your "Peripatetic" correspondent; and it is unfortunate that in every case the yellow stain was produced, proving that the silver combined with the albumen, or a constituent of the albumen, is not soluble in carbonate of ammonia nor strong liquid ammonia. I had tried these before and failed; but, supposing from the remarks of your correspondent that perhaps I might have made some mistake previously, I was induced to try both again, but with the same result. Carbonate of ammonia should be added to the fixing bath to render it alkaline and prevent the precipitation of sulphur in the prints from spontaneous decomposition or acid introduced from imperfectly-washed prints. The free nitrate of silver should be thoroughly removed from the prints by washing before toning, and the toned prints as thoroughly washed before fixing.

I next added some of the fresh, unsalted albumen to a solution of pure nitrate of silver, which gave a white, curdy precipitate; this precipitate was well washed by distilled water until the filtrate gave no reaction with hydrochloric acid. Part was then dried and incinerated. The addition of the albumen to the silver and subsequent washing were done in artificial light. The charred mass was introduced into a test tube and boiled in dilute nitric acid; the filtrate, tested with hydrochloric acid, gave a white precipitate soluble in ammonia, proving the presence of silver in combination with the albumen, or a constituent of the albumen, and soluble in nitric acid. Other portions of the original precipitate were boiled separately in strong liquid ammonia and hyposulphite of soda. The filtrates tested by sulphuretted hydrogen water and sulphide of ammonium gave dark-coloured solutions in both, proving that there was present a salt of silver soluble in hyposulphite of soda and liquid ammonia. The precipitates were then well washed, until all trace of soda and ammonia had been removed, dried, and incinerated. Introduced into two test tubes with dilute nitric acid and boiled, the filtrates gave milky precipitates with hydrochloric acid, proving the presence of a salt of silver insoluble in hyposulphite of soda or ammonia, but soluble in nitric acid.

Another portion of the original precipitate that had been treated with hyposulphite of soda and well washed was boiled in nitric acid; the precipitate turned a beautiful yellow colour. On testing the filtered solution with hydrochloric acid, it gave a milky precipitate, which disappeared on the addition of ammonia, the solution becoming a clear, bright yellow colour. I added nitric acid to neutralise the ammonia, but no change of colour resulted; on adding hydrochloric acid the yellow colour disappeared and the milky precipitate was restored. The yellow precipitate was washed on a filter with distilled water until there was no acid reaction to blue litmus paper, dried, and incinerated; it was boiled again in nitric acid, and the filtrate, when tested with hydrochloric acid, gave a slightly milky precipitate.

Another portion of the original albumen precipitate that had been well washed to free it from the excess of nitrate of silver was exposed to light in a test tube under distilled water, when, after a short time, it darkened to a deep red colour, and the distilled water gave a slightly *acid reaction* to blue litmus paper. The darkened precipitate was now divided—one part boiled in a solution of sulphurous acid, producing no change; the other part was boiled in hyposulphite of soda, which changed the precipitate to a flesh colour. The filtrate gave dark-coloured solutions with sulphuretted hydrogen water and sulphide of ammonium, proving that the silver enters into combination with a constituent of the albumen (chloride of sodium) which is sensitive to light without the presence of free nitrate of silver, and, where the reduction is not completed by the action of the light, is soluble in hyposulphite of soda.

Another portion of the original precipitate that had been boiled in hyposulphite of soda and well washed was exposed in a test tube

under distilled water to the action of the light for some days without showing any change of colour. The precipitate, on being dried and incinerated, boiled in nitric acid and tested as before, showed the presence of silver, proving that there also exists a salt of silver in sensitised albumenised paper that is insensitive to light and insoluble in hyposulphite of soda. Might it not be a combination with the sulphur of the albumen instead of an organic compound?

A toned print that had been fixed and well washed was incinerated and introduced into two test tubes. To the one was added dilute nitric acid; to the other nitro-hydrochloric acid, and both boiled. The filtrates, when tested by hydrochloric acid and protochloride of tin, gave, in one, a milky precipitate of chloride of silver soluble in ammonia; in the other, a pink solution, indicating presence of gold. That the gold was in small quantity was evident by the reaction, but if the toning were sufficiently prolonged it was probable that the gold would take the place of the silver altogether; but, as Mr. Dunmore truly says, it would be at the sacrifice of the beauty of the print, although it would increase the chances of permanency, as it is more than likely the gold is precipitated in the metallic state in a minute state of division, and would, consequently, resist better the effect of oxodising agents. There can be no doubt that with a negative having transparent shadows, dense high lights, and long exposures a more complete reduction takes place in the shadows, which offer a longer resistance to the action of decomposing agents, or "bleaching," as it is called; but it is only a question of time if the element fatal to its permanency be present.

Prints on plain paper have, as a rule, been more permanent than those on albumenised paper now are; but perhaps in those days when prints on plain paper were fashionable paper-makers were more careful in making and sizing of the paper. I have prints on plain paper which show no more symptoms of fading now than when they were printed twenty-three years since. This cannot be due to alkaline gold toning, new fixing baths, or perfect washing, because none of these were used. The toning bath was rather acid than alkaline, the soda perhaps a day or two old, and the washing anything but perfect. I admit that hyposulphite of soda left in the print through imperfect washing will, in the *presence of moisture*, soon destroy it; but hyposulphite of soda is very soluble in water, and not so difficult of removal as is generally supposed. Therefore, the element fatal to permanency is not always, nor in most cases, due to the presence of hyposulphite of soda, but is in the paper itself.

Every student of chemistry is taught to know that albumen is an organic compound which decomposes by keeping in the presence of heat and moisture; that decomposing albumen evolves sulphuretted hydrogen; and that sulphuretted hydrogen in the presence of moisture is fatal to the permanency of a silver print. Therefore, albumenisers of paper should never add fresh albumen to old-kept stock to make up the bulk, as the old, if decomposition have begun, will soon spoil the whole, especially in hot weather.

There are many antiseptics that might be used to prevent the tendency of albumen to putrify, such as carbolic acid, chloroform, oil of valerian, or camphor. Some of these might be objectionable on account of their disagreeable odour, and as they are all volatile their antiseptic properties might disappear with their presence; that is to say, if the tendency of animal matter to putrefy is only suspended by the presence of antiseptic bodies, and not permanently stopped. It appears to me from long and close observation that the best antiseptic is the nitrate of silver bath, which will, if the albumen be fresh or new, coagulate it thoroughly. Even supposing that decomposed albumen had no effect on the permanency of the finished print, it either partially or entirely refuses to coagulate on the nitrate of silver bath, and becomes more or less soluble in the fixing and subsequent washing, leaving the finished print flat and mealy, with little or none of the original gloss of the paper. Weak solutions give precipitates in a finer state of division than strong ones, and are, therefore, in a better condition for rendering in harmony the details of a good negative, with less risk of bronzing in the deep shadows; therefore, a stronger silver bath than thirty grains to the ounce of water is unnecessary, as it does not give better results nor add to the permanency, but the strength must be kept up. It is from the fine state of division of the silver precipitate that the silver print has the advantage over a carbon print on paper. The one is the result of chemical union, while the other is a mechanical mixture.

As sulphurous acid has been frequently referred to as the probable cause of silver prints fading, I tried the following experiment:—Two samples of water saturated with sulphurous acid were used. One I made myself perfectly pure and free from sulphuric acid; the other was that used by paper-makers to stop the putrification of the scrows or skins when making their gelatine size. I immersed several well-washed prints in each sample, and left them for some days, covering each dish with a plate of glass to keep out dust. On being examined the pure sample had not changed the colour of the prints in the slightest degree, other than rendering the paper transparent from a partial solution of the size, which disappeared on drying. The other had changed the whole of the prints quite yellow, *whites* included; but none of the details were eaten out, as would have been the case had they been immersed as long in as dilute a solution of hyposulphite of soda. On the addition of a drop or two of sulphuric acid to the pure sample the prints turned yellow, like the other. I do not, therefore, see—supposing the albumen or size of the finished print were to decompose—where the sulphurous acid was to come from, as sulphurous acid is not the result of putrification; it has rather a tendency to stop it.

Sulphurous acid generated from the burning of coal in the fireplace of a room may pervade the atmosphere to some extent, and so may sulphuretted hydrogen from imperfectly-manufactured coal gas, but neither will combine with the silver or gold forming the photographic image in the absence of moisture; and if sulphurous acid discharge the colour of an organic stain it does not do so permanently, like chlorine.

My conclusions are that the image is the result of a chemical union between the silver and organic matter of the albumen or size of plain paper in the presence of light and moisture, and not an organic stain in the absence of silver.

JOHN LAMB.

COLLOCINE DEVELOPER.

I AM at last become converted to the collo-developer. I think I must have been prejudiced, for I now get excellent negatives with the same mixture I condemned. It came about in this way:—

I was at work one day from home, in my trap, and, when I came to develope, found I had used up all my ordinary acetic acid developer; there was no time to mix fresh, and the bottle of collo-developer was staring me in the face. I resolved to use it, and was agreeably surprised to find a capital negative, so like those I had been taking that I could not tell one from the other. On my return home I made a Winchester of the developer, *minus* the restrainer, and the next morning I filled three sixteen-ounce bottles with the decanted mixture, and added to one a drop of collocine, to the other the same and two drachms of glacial acetic acid, and to the third the same quantity of acetic acid and no collocine. Now that I had confidence I used it in my work. I had to take several negatives of the same subject, so I carefully exposed the same time and treated them the same in every respect. The collocine and the acetic acid negatives were precisely alike; but the negative with the two combined was a little over-exposed, thus confirming my former opinion that in combination with acetic acid it proved an accelerator.

With regard to the manufacture of the article, it is peculiar. Mr. Burton says he made a great blunder in calculating the proportions; still the result was the same. I had an accident in making it. I left it simmering after the addition of the zinc, and during my absence it had effervesced all out of the flask; the flask was broken, and covered with the charred preparation. I collected it all, mixed it with the proper bulk of water, and filtered. It worked as well as the lot prepared without any mishap.

I now boil the gelatine and diluted acid together, use no zinc, add one fluid drachm to fifty-nine drachms of water, place some marble in the bottle, and when I want to use a drop I take a drachm by measure. I also make up the bulk of the original preparation to the fluid measure of acid and water used.

I have not tried the proto-nitrate; but the favourable report of such a painstaking worker as Mr. Brooks will induce me to do so.

F. YORK.

ON THINGS IN GENERAL.

WHAT a pleasing variety has been imparted to photographic matters during the past month by the manifestoes and vagaries exhibited by the Edinburgh Photographic Society! The great medal question has not been debated with such earnestness—not to say acrimony—for many a year past. Every reader of the Journal will have had the whole arguments, *pro* and *con*, presented to his mental intelligence with such a fulness of light thrown upon both sides of the question that, be he Scot or Southerner, he can have no excuse of want of knowledge for not boldly declaring under which banner he will fight. Fain though I would say otherwise, I cannot withhold the expression of my opinion that the pro-medallists will be by far the larger array. There is a restless, ineradicable craving in the human mind for outward symbols of distinction, whether it be in the savage who strings

up his victims' scalps to be beheld by all his fellow-warriors, or the patrician whose head-gear token of rank, far too uncomfortable for general use, must be painted and carved and as publicly seen as the other ghastly tokens. And so far it would appear as if the scalp-hunters had gained the day in Edinburgh. Pity the city could not have made itself famous for the self-abnegation of its warriors, and the Edinburgh Photographic Society have left its self-denying ordinance remain unchallenged! But who could expect nineteenth-century Christians to offer their own heads to the scalping-knife?

Mr. Neilson has some very suggestive remarks on the question, pregnant with good sense; but he has allowed his zeal a little to outrun his discretion in supposing that artists of eminence do not offer rewards for merit. It will suffice for me to name the Manchester Academy, which has founded a distinct school of painting; it offers a reward—annually, I believe—for the best picture in the exhibition it annually holds. It cannot be denied that the bestowal of medals at any exhibition is often performed either very perfunctorily or very unjustly. We all remember the celebrated optician to whom a medal was awarded for his lenses declining to accept it because of the moral worthlessness of the adjudication, seeing that the key of his locked-up exhibition case had never left his pocket.

There is every reason for anticipating a success for the Edinburgh show, as, apart from other causes, all the pictures from the Philadelphia collection and from the Paris exhibition will be at liberty, and, presumably, open to competition.

Praise seems to be universally accorded to the American pictures at the Centennial Exhibition, though one of the great American names is conspicuous by its absence. Messrs. E. and H. T. Anthony and Co. have got up a show of their own in Broadway, New York, the executive committee having declined proper accommodation for a big show-case they had constructed for the occasion. Possibly it reversed the Vicar of Wakefield's dilemma—was too large to go in at the door. One of the American newspapers has some hazy ideas on a clear subject. The New York *Tribune* speaks of "the splendid climate of San Francisco" enabling a firm of photographers "to present some marvels from life in crayon and pastel;" the same paper pokes a bit of fun at a well-known name in speaking of the "enormous-signatured Sarony." The mouths of some of the brethren of the camera on this side the Atlantic would water at the idea of the profits suggested by the ten thousand ticket-holders who were all photographed in ten days by one firm. I suppose we must believe the statement to be true.

One of the events of the month seems to be a new patent process for improving photographs. There has been a few months' lull in this sort of thing of late, which I think must be almost played out now. However, the new "mezzotint" method is pushed in reasonable language, no very large sum is required, and no difficulties are placed in the way of working it, so that those who believe in art by machinery can indulge their fancy at little expense. I confess I do not exactly see the logic of refinement in faces being obtained by elaboration of background. The effect obtained by the patent process is certainly peculiar, and to some may be pleasing. It occurred to me, when examining the specimens, that the tinting mask was a negative from a piece of grained Bristol board, similar to what the old French *passe-partouts* used to be made of.

The great case of Lock and Whitfield has passed the stage of the nine days' wonder, and has now sunk into oblivion. It will, however, be a caution to principals to see that their show-room attendants be most careful in the promises they make to their clients when "pushing enlargements." The method so frequently adopted of "paying by results" is apt to produce an over-excess of zeal, leading to the promising of impossibilities. I presume this method had its origin in the success attending drapers, who have, I believe, a method called "tinging"—a sort of commission to the shopmen on the sale of bad stock—some first-rate hands making several guineas a week by it, and correspondingly filling their employers' pockets.

Can any one enlighten me as to whether there is any practical outcome of all the discussions, experiments, denials, and assertions in connection with "Dr. Vogel's colour theory?" Anyone reading the literature of the last six months would imagine a process had been discovered by which a yellow, red, or green object could be photographed with greater speed than a blue one, but no one I have met with has performed the feat. The chief results seem either to be too rough to bring before an audience or too refined to be seen by ordinary observers, or, in fact, too anything to be of the slightest use or interest to anybody.

Now the celebrated antimony process, which I have heard described as "the great stink process," cannot be spoken of in that manner. Some antimony pictures have really been seen—utterly worthless, to be sure—but yet they belong to the realm of realities, though their importance has dwindled down from a "new method of photography," through a *Note on the Production of Antimony Photographs*, to "particulars given more with the view of encouraging further experiments with a newly-observed solar reaction than with the view of detailing a readily available process for immediate adoption by practical photographers."

The practical process which to me appears to promise more for the future of our art than any made public for some time is Mr. Warnerke's. Photographers lie under a heavy debt to him, which he has increased still more by his description of his new method of taking panoramic pictures with the aid of his films. As far as I see he goes steadily on discovering and improving, and yet patenting nothing, his only monopoly being his skill. Mr. Aldridge has been rather heavily "let down" for the publication of his ideas on monopoly as regards lenses. But are the Editors and others quite right about the absence of monopoly—at any rate in theory, if not in practice? I am under the impression that one well-known and commonly-used form of lens is patented, and I have a very distinct impression that dire pains and penalties were threatened not very long ago against all and sundry infringers.

The Editors have reproduced a very suggestive article from *Mosaics* on *Art and Mechanism*. I think, however, the time has gone by when there was a necessity for such articles to help our status. We never notice now that the claims of photography to be a fine art are denied by the art-aristocratic journals, though it is not admitted in words; "judgment has gone by default." It is only a few weeks since I noticed in the *Athenæum*—once our sworn foe—more than half the paragraphs of its art-gossip column devoted to photographic doings and photographic pictures. FREE LANCE.

A METHOD OF PRODUCING ETCHABLE PICTURES FOR PHOTOLITHOGRAPHIC PLATES, &c.

[A communication to the Photographic Society of Vienna.]

In the production of plates intended for etching the principal consideration is the preparation of a picture which shall be perfectly capable of resisting the etching fluid. Such are—1. Resinous pictures. 2. Pictures produced by the reduction of a metal or metals. 3. Pictures in fatty inks, which can also be made perfectly resisting by having powdered resin dusted over them.

Resinous pictures can be produced in three different ways:—1. By the asphalte method. 2. By the dusting-on process. 3. By resin in combination with chromium salts, so that the resin employed loses its solubility in every place that has been exposed to the influence of light. In this method the most important thing is to use a solvent for the resin which shall, at the same time, combine with the chromium salt; consequently, as neither alcohol nor etherialised oils will answer the purpose, ammonia should be the best solvent. Resinous pictures, and those produced by metallic reduction, are, however, seldom used in these days; on the contrary, the indirect processes are always increasing in favour, as by them it is possible to work faster, since the transferred negative is no longer required.

By the indirect method the picture, as you are doubtless aware, is produced upon prepared paper, which, blackened and developed after the exposure, only retains the colour in the parts upon which the light has acted. For the preparation of the paper gelatine, albumen, starch, gum, and the chromates were formerly used; but paper prepared with these materials generally gave but insufficient results. For example: with albumen paper we secured very delicate lines, but, owing to the paper being easily rubbed off and the colour adhering where that happened, a clean background could not be secured. This, and many other difficulties, I have overcome simply by preparing a double surface to the paper.

These two films must, above all, fulfil two conditions:—1. The upper film must be easily removable by washing with cold water, while the under one adheres fast to the paper. 2. Both films must be sensitive to light; the upper film is albumen, the under gelatine. I produce the upper film at the same time as I chromatise; that is to say, I let a sheet of paper float five minutes upon a solution of—

Albumen	50 parts.
Water	50 „
Bichromate of potassium or ammonium	7 „

I expose the paper so prepared until the lighted parts have become brown, and, thereupon, proceed to blacken it immediately without a previous washing. For blackening I use a brush with which I can apply the colour equally, either thick or thin, according to the closeness of the strokes. The colour itself is composed of one part of printing-ink and three parts of whiting, into which oil of turpentine

is stirred until the whole is of a consistency suitable for painting with. This colour is carried equally over the paper, which is then rubbed with cotton-wool to make sure that the coating is perfectly equal, and when the oil of turpentine has completely evaporated I develope.

The developing is performed with cold water, in which the paper is left to soak for at least twenty minutes, after which time the colour may be removed with the greatest ease from all those places unaffected by the light, and without any colour adhering to the background. The reason of this is that, in the meantime, the swollen-up under film retains the water and throws off the fatty ink, while in the insoluble lighted parts the colour adheres with uncommon tenacity, because the action of the light has penetrated to the under film, thus rendering a streakiness in the grain impossible.

Pictures produced in this way may be transferred by the ordinary transfer process to either stone or zinc. G. Märkl, Jun.

ODIC PHOTOGRAPHY.

Although the subject of the following communication may not be immediately connected with the *art*, it is with the *science*, of photography, and more than it may, at first sight, appear to be, inasmuch as there is good reason to believe that the so-called actinic rays, if not identical, are associated, with the odic emanation. Therefore, the more scientific photographers will, I hope, be inclined to repeat a few very simple experiments thereon. These I will endeavour to explain clearly.

In 1846 Professor Gregory, of Edinburgh, published an *Abstract of Researches on Magnetism*, by Baron von Reichenbach (Taylor and Walton), and in 1851 the *Researches* were republished, with notes by Dr. Ashburner (Ballière). These volumes contain only an account of one experiment, made with the view of ascertaining if the light which was seen in *perfect* darkness, by highly sensitive persons, to emanate from magnets, crystals, &c., &c., was capable of influencing the daguerreotype plate. It did so, but was so slightly successful that it does not appear that any further attempt was made for some time afterwards to prove this point.

Having no facilities for making a room *perfectly* dark, I imitated it by making a small box perfectly dark. The box is about $14 \times 9 \times 5$, made of oak, having a return fillet to the lid, and all the joints thoroughly covered by black material glued on, and is lined throughout with lampblack and size. In this was fixed a compound magnet (1) having a sustaining power of fifteen pounds, and in front of it a shelf (2), on which to place the holder and plates (3). The plate nearest the magnet and in front of the sensitised plate had strips of black paper gummed on to it.

On March 28, 1876, at eight p.m., a plate was sensitised, placed, and the box locked, being put into a dark corner of the photographer's dark room, and covered with thick cloths. At the end of twenty-three hours the action of light on it was distinct, but, as might be expected, it was not a fine specimen of the art. The next experiment was followed—with time two hours—by a much better result. As the strips of paper got wetted and came off, I painted "O D" on a glass plate and used that in the after-experiments, getting many proofs of the action of some kind of light in *perfect* darkness.

At this time I became acquainted with a pamphlet by Reichenbach, published in Berlin in 1862, in which he gives a most minute account of a long series of experiments on the action of the odic light on photographic films. Some of these I have successfully repeated, especially one—that of the remarkable fact that the odic emanation from human beings impresses the sensitised plate. This was accomplished in the following manner:—Into a perfectly dark box a sensitised plate was put, having a stencilled figure of a star before it, and through the end of the box a glass rod three feet in length was passed to within half-an-inch of the sensitised plate. On the exterior portion of the glass rod five persons placed one hand each for three minutes, and the result was a figure of the star; also, with the plate on which "O D" was painted, the figure of that was obtained in eight minutes. It should be observed that these experiments were made in the photographic room, between ten and eleven p.m., so that no daylight could possibly act on the plates.

Various objections have been made to these facts, one of which was that the presence of the magnet had nothing to do with the results obtained; I therefore removed the magnet, all other conditions being observed, but, of course, had no figure. Another objection is with regard to the human hands; all else being the same, without the hands—no figure.

The pamphlet of 1862 is in course of translation, and will be published shortly. The details of the experiments are so complete that they cannot otherwise than aid, very materially, anyone inclined to pursue this most interesting branch of science.

Having, in the first instance, supposed that, being a very weak light, a long time would be required, the plate was left, as mentioned above, for twenty-three hours; but Reichenbach has shown that at half-an-inch of distance, and the time fifteen minutes, the best average conditions are obtained.

I hope that the explanation here given, with the specimens of the results previously sent to the Editors, may induce some of my co-readers to enter on an investigation of these curious phenomena, and so advance the great discovery made by Reichenbach.

Henry Collen.

AN IMPROVED MECHANICAL PRINTING PROCESS.*

While the preparation of the sensitive mixture is being completed place the glasses to be prepared—which must previously have been well cleaned—on the cross-bars of a drying case. By means of adjusting screws take care that each plate is made perfectly level, as it is seldom that the glasses have the thickness uniform from one end to the other; and remark well the position of each, so as to be able to replace it in the same manner after the plates shall have been removed.

The drying case is made of a white wood free from resin, and formed rectangularly with the sides inclined outward, like an inverted pyramid, with bars on which to lay the plates. The bottom is made of sheet iron, and a lamp is placed below so as to form it into an oven. It is heated by a spirit-lamp, although it is much better that several flames or gas jets should be employed, as this causes a much more uniform distribution of the heat than when one only is employed.

The case is divided horizontally in the middle by a partition of sheet iron, the object of which is to retain and equalise the emission of heat. It is shut by a movable hinged cover pierced with holes, covered over with yellow cotton. These permit of the vapours escaping and prevent the admission of light. A hole is also made by which to insert the lower end of a thermometer, so as to register the heat inside.

The glasses, as has been said, lie on levelling-screws, which are fixed in flat triangular pieces of metal to the number of six or eight, and sufficiently rigid to prevent them from bending with the weight of the glasses. The cross-pieces lean on two supports of wood fastened to the sides of the case, and so low that, when the case is shut, it will be some distance—say the space of twenty centimetres—from the top. This allows of a deep cover being used.

This description may prove defective; but it could not be rendered clearer without drawings, which are great aids to the understanding of apparatus of this kind. But, to sum up the requirements of the drying-box. The interior must be maintained at a given and constant degree of temperature; evaporation of moisture from the plates is to be permitted; no dust or light should be allowed access; and the arrangements for holding the glass plates must be such as to ensure their being dried while retained in a perfectly horizontal position, without which uniformity in the printing could not be obtained.

How to Coat the Plate.—It is necessary that the plate should be uniformly and moderately warmed previous to applying the sensitive coating. For this purpose a hot-water vessel must have been provided. This is made of tin, with a strong and flat plate of copper forming its upper surface. The thickness of the vessel is about six or seven centimetres, and the size of the upper surface a little exceeding that of the plate of glass to be warmed. The hot water is poured in through an aperture that is closed with a cork. This is an article of such great utility that the mechanical printer ought never to be without it. Upon the upper surface of this hot-water bath the glass plate is laid, and when it has acquired a certain temperature, estimated by the touch, it is removed from the bath and balanced upon the points of the fingers of the left hand, as this is found to form a better and more manageable support than anything else. A sufficient quantity of the sensitive *matériel*—which, as already directed, must have been kept at a temperature not exceeding 140° Fah.—is now poured upon the centre of the plate, and, by means of a warm glass rod covered with blotting-paper, it is spread from side to side. To equalise the coating the plate is slightly inclined from one side to another. If any particles of dust or other impurities are perceived on the coating they must be removed by applying one corner of a piece of blotting-paper. If during these operations the gelatine should become too cold, fluidity is restored by holding it for a brief period over a charcoal chafing-dish or brazier.

* Continued from page 316.

To Dry the Plate.—The plates having been prepared in the manner directed, each one is carefully restored to its place upon the levelling-screws it formerly occupied in the drying-box, and the spirit-lamp or gas having been lighted the lid of the box is gently closed. The temperature must be so adjusted as to keep the thermometer standing at 100° Fah. for two hours, the period which experience has pointed out as being that required for drying the film. At the termination of that time the plates are examined, and if the operations have perfectly succeeded the surface will present complete uniformity from side to side, notwithstanding any undulations or inequalities which may have been in the surface of the glass; it will also present a matt appearance.

It is scarcely necessary to observe that these operations should be conducted in a room to which yellow light alone has access; but, on the other hand, it is important to bear in mind that bichromatised gelatine is not rendered insoluble by the action of light until after it has become dry. This knowledge allows the plates to be examined by ordinary light previous to the film becoming desiccated.

CTE. LUDOVICO DE COURTEN.

(To be continued.)

A METHOD OF PRODUCING A FINE STIPPLE ON PHOTOGRAPHS.

THE first requirement is to obtain the stippled groundwork, which cannot be better or more rapidly produced than by the well-known Vanderweyde process. Whether it is to be a uniform stipple or a clouded effect must be left to the judgment of the artist.

But in order that there should be no lack of variety in these backgrounds it will be well to sensitise say twelve half-sheets of albumenised paper and expose them in the usual way, so that some may be slightly tinted and others darker; then have these half-sheets mounted upon stout cardboard. Great care should be taken to thoroughly examine the paper after it has been starched, to see that no grit or solid substance adheres to the paper before it is applied to the card, otherwise little projections would appear on the surface of the paper which would prevent the artist producing a uniform stipple. When dry they should be well rolled.

Concluding that the artist has stippled the entire surface of each of these half-sheets, the next operation is to copy them in the usual way upon *carte* plates. The coarseness or fineness of the stipple is to be regulated by enlarging or decreasing the size of these original negatives by first making a transparency and afterwards the negative. I have an idea that a very good effect is to be produced by using a transparency instead of a negative, especially in applying it to portrait negatives before development.

A great deal has been written of late in the photographic journals of the advantages gained by rapidly exposing the plate after it has received the image in the camera to a feeble light. Now I think that if an advantage be gained by so doing, another could be added to it by placing upon the negative which has received the image small pieces of blotting-paper to prevent the negative—or transparency I should say—from touching it, a second's exposure being sufficient to impress an image of its stipple. I believe by this means a stipple might be produced in the negative which would appear in all after-copies without further trouble. Now, with respect to applying the stipple to vignette prints you must proceed as follows:—Take as an illustration a *carte* vignette print as taken from the printing-frame. The print is placed upon a piece of glass; then you get your stippled negative, clouded or otherwise, and place it, film side, on the print; now mix a little powdered lampblack and glue together, so that it will make an opaque mark upon a piece of glass when held up to the light. With this you paint the shape of the head and bust on the back of the stippled negative and expose to light. The object of using this mixture of lampblack and glue is that it can easily be wiped off when it is required for a vignette of another person. By the foregoing it will be seen that this process is just as suitable for large prints as for small ones.

You might still add to your effects by either designing some pretty wreaths of flowers, or copying some, already well drawn, out of the many art publications—say to encircle the head and bust of children. As a rule these copies would print too decided; but by placing the stippled negative over the vignette, with the wreath of flowers painted round it, a subdued representation of this artistic addition would be the result. ALFRED E. DIGHTON.

FOREIGN NOTES AND NEWS.

DR. VOGEL AT PHILADELPHIA, AND HIS IMPRESSIONS OF THE EXHIBITION.—THE GRAPHIC DELINEATION OF SOUND.—THE ILLUSTRATION IN THE *MITTHEILUNGEN*.

THE season is fast approaching when the photographic parliaments, as well as the more august assembly at Westminster, begin to think of holidays, and the members to scatter themselves in all directions in search of sport, health, fine scenery, or what not. Many will, no doubt, combine business with pleasure and visit the attraction of the hour—the Centennial Exhibition at Philadelphia. First impressions of the exhibition in the Photographic Hall have already appeared in the pages of THE BRITISH JOURNAL OF PHOTOGRAPHY, but those of our readers who stay at home may not take amiss the following account of Dr. Vogel's first impressions as communicated to the *Mittheilungen*. It will be seen that our learned friend, who is on the photographic jury, thinks his countrymen come well to the front in that particular department, but he is very far from admiring their taste as generally displayed in the German section; in fact, he seems to consider the display there a disgrace to the country. His words are:—

"The Exhibition is grand, and offers a crowd of things well worth looking at, all being arranged with great taste and shown to the best advantage. The principal building—a simple wooden structure—has certainly cost less than that at Vienna; but it looks much better, both within and without. It consists of a long nave and two transepts, all abundantly lighted. The arrangements are so practical and tasteful that at the first glance the visitor is enchanted. At Vienna the only positions that could be considered good were those in the nave or rotunda, but this difference does not exist at Philadelphia. Naturally, America occupies most space.

"The German section is once more that which makes the least favourable impression. There is little to be seen but merchandise intended for sale, and some of that comes under the category of very small wares. German exhibitors seem to take the exhibition more for a great fair than for a place where they should only send their best work. The arrangement also leaves much to be desired. It is unfortunate that as yet Germany has made a regular *fiasco* of her arrangements at every international exhibition that has been held. 'Cheap and nasty,' says the New York *Sun*, is the motto which might with propriety be written over the German section.

"Happily this shameful motto is not at all appropriate to German photography, which is worthily represented, and will receive honour—so much the more as that in the erection of the photographic hall care has been taken not to put good things out of sight in a corner.

"The external and internal form of the hall is already known to you from former accounts. On the very day I started I received a letter stating that the building was still far behind, but on my arrival I found it quite complete and the greater part of the pictures already hung. The exterior of the hall is plainer than it was represented in the plan, possibly from reasons of economy. The interior leaves nothing to be desired. It is excellently lighted every way by top and side lights, so that there is, if anything, rather too much than too little. The walls are of an orange-brown, so that the pictures are beautifully thrown out. The division of the space is in the highest degree effective; in short, the whole is such that one can only offer the warmest acknowledgments to the arranger, Mr. Carbutt.

"Germany seems to have exhibited more largely in photography than any other foreign nation. France and England have comparatively few exhibits, and these few are not yet unpacked. A greater drawback, however, is that a large number of photographic exhibits are not in the Photographic Hall but in the principal building, mixed up with thousands of other articles. Thus, Römmler and Jonas, the Photographic Company, and others are in the bookselling department in a place which is nothing less than favourable, while they might have had the best places in the Photographic Hall by applying in time. In the same way some of the French photographs as well as some by Italian and Indian artists are in the principal hall, and how the jury are to find them all out is a riddle to me.

"The catalogue is quite untrustworthy, and the organisation of the juries unpractical; but I am not here going to tell tales out of school. I have gone through a good deal at former exhibitions, and will go through more at this. However, I may mention here as a curiosity that in the jury for wines there are two Americans who are teetotallers, who not only abstain from wine and spirits, but condemn the use of them altogether.

"As yet I can give but few particulars about the photographic exhibition. The Americans, amongst whom are Kurtz and Rocher, shine in quantity and quality. Silver prints predominate, landscapes are better represented than at Vienna, and chemicals and apparatus of distinguished quality are also present. The lichtdrucks are not yet all displayed. There is, therefore, ample opportunity to see and learn, but it is by no means given for nothing. Even from my few days'

experience, and from what my colleagues have told me, it is evident that a stay here is excessively expensive for strangers. With the assistance of friends I have got off pretty cheaply, yet a night's lodgings and breakfast costs a dollar and a-half (about six shillings and sixpence); and the charges at the exhibition restaurants, which one must frequent, are enormous, and they give neither coupons nor season tickets. A beefsteak and cheese cost a dollar (about four shillings); dinner five or six shillings. Verily, whoever means to come here should lay to heart Iago's advice—'Put money in thy purse!'

"One of the most interesting things in the exhibition is the *depôt* of the Centennial Photographic Company, which, as at Vienna, has the monopoly of photographing all exhibits. Their establishment is close to the principal entrance—a most favourable situation—and consists of a portrait studio and a printing place. In the former the portraits of exhibitors, used for attaching to their season tickets, and groups are taken. In the printing establishments, where a hundred persons are employed, there are thousands of negatives in use, and the portraits of exhibitors are turned out at the rate of 695 per diem. This rate of production is only rendered possible by taking three sitters on the same plate, and operating in five glass-houses at the same time. All views are taken by the wet process—some in tents, and some in wagons fitted up as dark rooms, *à la* Ruckwart."

The *Mittheilungen*, in speaking of the-as-yet-unsolved problem of the graphic delineation of the tone and strength of sounds by photography, as has already been successfully done in the case of the waves of light, of the sea, and of the pulse beat, considers it by no means vain to cherish a hope that "sound" photography will one day beat stenography out of the field, and that a piece of music while being played, and a discourse while being spoken, will be seized and fixed pictorially.

The old proverb which says "it's an ill wind that blows nobody good" may be supposed to be equally true in its converse—it's a good wind that blows ill to nobody. It certainly does so in this case, for, assuredly when the glorious day on which stenography is beaten out of the field arrives, and crowns the hopes of the *Mittheilungen*, many photographers will be rendered happy; but think what an evil day it will be for the reporters thrown out of work, and still more so for those gentlemen who are "unaccustomed to public speaking" when they rise to speak after a public dinner, an election, or any occasion that finds them unprepared or nervous, if thus suddenly deprived of their natural protectors, the reporters! Who will now correct their grammatical errors, and judiciously omit their repetitions when "trying back" for a better ending to a sentence? Who will now be the ready scapegoat sharing with the compositor the responsibility of all uncorrected blunders, which are at present attributed to some failure in their duty of the former's ears or the latter's eyes, and called "reporters'" or "printers'" errors? Perhaps the editor who has a number of sound photographers on his staff will find it necessary to employ a negative retoucher with a quick eye for grammatical transgressions, and a facility for softening down ragged periods. For such a post there can be no reasonable doubt many ex-reporters would willingly qualify themselves, and would not be too particular as to whether they earned their crust as stenographers or as sonophotographic negative retouchers.

But *revenons à nos moutons*—represented in this case by the possibility of photographing sound. According to *Poggendorff's Annalen*, Dr. Konig, of Paris, has constructed a simple apparatus, consisting of a burning jet of gas at one place, on whose feeding tube there is an opening closed by an elastic skin. If anyone speak or sing against this skin it communicates to the flame a peculiar, tremulous motion, which, reflected from a mirror mechanically drawn along, has the appearance of a curve of light *whose form varies with the tone or strength of the sound sung*. This curve Dr. Konig photographed, taking care that the clockwork by which the mirror was set in motion moved regularly, and that the gas employed was one giving a powerfully-actinic light. Such a light, Dr. Vogel thinks, cyanogen gas ought to give, as it has a very distinct spectrum in violet and ultra violet; but for photographic purposes it has not yet been tried. Twenty grammes of cyanide of mercury, if gently heated, he thinks, ought to furnish sufficient gas for a full hour's experiment. Does anyone feel inclined to try it?

The illustration to this month's *Mittheilungen* is a lichtdruck reproduction of a child's portrait by Herr Hugo Thiele, of Dresden. The picture is, on the whole, very good, and might easily pass for an ordinary silver print, there being nothing to tell that it is mechanically printed. The shadows are somewhat dark; but we are told that that is not the fault of Messrs. Rommler and Jonas nor of their Schnell press, in which the picture was printed, but of the negative being under-exposed. By using the Schnell press from 1,000 to 1,200 copies can be thrown off daily.

Correspondence.

THE MEZZOTINT VIGNETTE.

To the EDITORS.

GENTLEMEN,—The old adage again—"There is nothing new under the sun!" The process for which Messrs. Brown and Barnes have obtained provisional protection is really nothing new. Three years ago I made dozens of *cartes-de-visite* and large pictures by the same means. I had photographs of morocco leather and cloth used for bookbinding—the latter affording a fine variety of styles—which I used for backgrounds, and also for the borders of cameo portraits. And not later than the month of June *this year* I made a 12 × 10 picture, the background of which was mezzotinted (bah!), and by a method which was a great improvement on the previous way I produced the new—oh! no; the *old*—effect.

Should the above statements be called in question I am quite prepared to send you the names of photographers to whom I showed the process; and my then assistant, who had a share in working out the process, and who is now with Mr. Bottomley, Bradford, can testify to the above.

These *facts* are patent; anyhow, I have no hesitation in granting full liberty to all and sundry, from "Land's End to John o' Groat's," to work the "old process;" and those wishing to be benevolent may remit the *whole* proceeds to the Photographers' Benevolent Association. "Such a generous course of action requires no comment."—I am, yours, &c. J. ROBERTSON.

Dundee, July 17, 1876.

To the EDITORS.

GENTLEMEN,—I was certainly surprised when I read the description of Messrs. Brown and Barnes' "novelty," and was forcibly reminded of the proverb about a certain class of persons rushing in where angels fear to tread.

To save the pockets of intending purchasers of a license I wish to place on record that the "new patent" process, *exactly* as described in your last issue, is one of a series of ingenious "dodges" shown by M. Lambert to me and many others upwards of twelve months since, which he termed "aristotypes," or mechanically-obtained Vanderweyde effects. As M. Lambert was in Liverpool, I believe, for some time, with all his specimens, it seems strange that Messrs. Brown and Barnes should never have heard of these pictures.

As no doubt you will have many more "reclamations," I conclude without any farther comment.—I am, yours, &c., H. C. JENNINGS.

Queen-street, Norwich, July 19, 1876.

To the EDITORS.

GENTLEMEN,—In your issue of this week is an article on *A New Effect in Portraiture*, invented by Messrs. Brown and Barnes. The same number also contains an advertisement threatening to prosecute all who infringe the patent taken out for said invention.

I beg, through your columns, to inform these gentlemen that I, and others whom I can name, have been conversant for several years with the method of which they claim to be the inventors, and that it is not at all new, though it may be so to them. Last summer and this I sent out hundreds of cards done by this method.

That I may make this perfectly plain I enclose three cards. One of them is from a lot of cards mounted this morning; another has hung in a frame in my waiting-room for about a year; and the third—an old one—I have picked from the waste basket, where it had been lying for about the same length of time. I, however, take no credit whatever to myself, as the method is known and used by others.

In conclusion: I can only express my mind by saying that the parties who have taken out a patent to protect this method of printing have acted rashly, and have been very ill advised to do anything of the kind.—I am, yours, &c., J. M. TURNBULL.

14, *Nicolson-square, Edinburgh, July* 15, 1876.

[The specimens forwarded by Mr. Turnbull are not quite similar to those of Mr. Brown. They differ in this respect:—Mr. Turnbull's pictures have a plain ground—that is, they are not vignetted—and they are surrounded by an oval matt or border, which matt is formed by placing an opaque oval mask over the picture and then printing the remainder (which has been previously protected) from a granulated negative. The effect is much the same as if an oval picture having a plain background were pasted upon a piece of matt paper. Mr. Brown's portraits, on the other hand, are *vignettes;* but the ground which surrounds the figure, and which in ordinary vignettes would be plain white, is covered with a fine stipple. This constitutes the difference between the "mezzotint vignettes" described by us and those we have received—not alone from Mr. Turnbull, but from *several* other professional photographers who have, for varying periods of

time, carried out in practice this method of finishing prints.—Eds.]

To the Editors.

Gentlemen,—A few weeks ago you gave a very favourable editorial mention of a little novelty which we introduced from Paris, called "*clichés pelliculaires*" for printing in an ornamental margin to the cameo vignette. Whether or not we may trace to these the parentage of another novelty patented by Messrs. Brown and Barnes, of Liverpool, under the title at the head of this short communication, we do not know; but certainly the results obtainable by their method are very beautiful, and surpass in artistic merit anything which we believe could be produced from the French *cliché*. The public will admire them in the form patented by Messrs. Brown and Barnes; and those photographers who adopt the process will agree that it is well worthy of the patent, especially as it is so liberally placed before them by the patentees.—We are, yours, &c., D. H. Cussons and Co.

Southport, July 18, 1876.

To the Editors.

Gentlemen,—Seeing the leading article in The British Journal of Photography of last week, entitled *A New Effect in Portraiture: The Mezzotint Vignette*, reminded me of a few thoughts which I jotted down about five years ago upon a process somewhat similar. I enclose them just as they were written at the time, with these few further remarks.

I remember reading last year of Mr. Tilley's method of producing pictorial backgrounds in the camera. Now if, instead of the pictorial transparency, one of these stippled transparencies before described is put in the position Mr. Tilley explained, the stippled effect might be produced in the negative at once, and so obviate further trouble beyond the usual printing.

These last remarks are more for Mr. Tilley and those who have purchased the right to use his invention.

I shall be glad if you publish this in your next issue.—I am, yours, &c., Alfred E. Dighton.

19, *Crystal-street, Chorlton-road, Hulme, Manchester, July* 18, 1876.

[The article by Mr. Dighton to which reference is made in the above communication will be found on page 344 in the current number.—Eds.]

EMULSIONS AND INTERCEPTORS.

To the Editors.

Gentlemen,—In reference to your sub-leader at page 329 I must still say that I cannot reconcile the articles in question with your explanation there given.

In the first place, I quite understood the general drift of your article at page 289 to be that organic substances act as restrainers, or even as retarders. The last five lines of the fifth paragraph, however, from their wording, led me to believe that you considered some beneficial change was brought about by the contact with organic matter; for you say:—". . as soon as the change . . . . has been effected the organic matter should be removed as . . . injurious." I think the conclusion to be drawn from this is that the organic matter, if only allowed to act on the bromide and not left in excess, is beneficial.

A few lines above those just quoted it is written that "it has been suggested that silver bromide may in some way (during its formation) enter into a union . . . . with organic matter." Now, as I understand, the bromide is enhanced in sensitiveness by this union; and you go on to say (as I read it) that this union may be brought about after the formation of the bromide with organic matter; *ergo* the paragraph in my letter at page 323.

I am still further mystified by your remarks of last week as to "the precipitated bromide emulsion" being found "more sensitive than an ordinary one." This is in direct opposition to your account at page 278, as there you say that the precipitated bromide, pure, and prepared with silver in excess, is "less sensitive than an emulsion prepared in the ordinary way with bromide in excess." Perhaps your remarks of last week include a clerical error.

Your experience on the comparative influence of iodide on dry films is very interesting to one who has tried to work the new and rapid (?) chloriodo-bromide process. My experience is the same as yours—that the image is very bold in development, and stands out dark against the unreduced bromide compound when viewed by reflected light.

It is worthy of notice that while both iodide and bromide emulsions may be formed in a fine state of division separately and with soluble haloid in excess, this cannot apparently be done when the haloid salts are mixed together previously to sensitising—at least not always; neither can the two emulsions be mixed. I had once occasion to make an iodide emulsion with soluble iodide in excess; some days after the formation of the emulsion, which was exceedingly fine, I tried to make the collodion more porous, so added a little carbonate of potash, with the result that the iodide was, shortly, precipitated and refused to re-emulsify.

At last I have got a camera fitted with Professor Piazzi Smyth's plano-concave "interceptor." I am not yet able to express an opinion as to its working, though the field is undoubtedly flattened, yet not entirely in my case; in some respects this may be an advantage. But, after all, I do not believe in the possibility, at present, of being able to secure a well-exposed, artistic photograph in the small fraction of a second. With well-lighted subjects this may be possible; but then well-lighted subjects are, as a rule, too "flat" to satisfy the eye. I think that with an aperture of $\frac{f}{4}$ an exposure of from half-a-second to one second will generally be required, if the view include trees or rocks in shadow, such as give force to a picture, even when a rapid gelatine plate is used. An exposure of half-a-second will render running water fairly well, but the shadows will suffer.—I am, yours &c., Herbert B. Berkeley.

Cotheridge Court, Worcester, July 17, 1876.

COLLOCINE.

To the Editors.

Gentlemen,—In your issue of the 14th instant I observe a letter by Mr. Brooks, in which my name very frequently occurs, and in which the writer charges me with misstatements respecting collocine and *his* use of it.

Mr. Brooks will probably remember that his formula was published in the spring, and was substantially the same as that given by Mr. M. Carey Lea—a circumstance alluded to in the article in which the formula occurs. The developer I experimented with was made in strict conformity with *this*, and my remarks have no reference whatever to any subsequent statement by Mr. Brooks, save and except that he (Mr. Brooks) had recommended a smaller proportion of the collocine to be used. How he could have read my statement to be the opposite of this I cannot imagine; and if he would re-read the article in question he would perceive his mistake. I can only reiterate my remarks made then upon this special formula—that it worked very unsatisfactorily for some days after it was made, but gradually improved into a good developer—not equal, however, to the developer I was in the habit of using.

I believe Mr. Brooks to be an earnest and intelligent worker, who freely gives his experience for the benefit of his brother photographers, and for which he is undoubtedly and deservedly appreciated; at the same time, if he have a pet formula it is no reason why everybody else should hold it in the same estimation, as he must know that the same thing worked by different people will give most variable results. For my own part, I am always anxious to get the best results, and when I find formulæ to supersede those I generally use I adopt them.

Apropos of Mr. Brooks's remark about *small* drops: if *minims* were used instead there would be more accuracy as to the quantities intended, a drop of some fluids being equal to several drops of others; and even a drop of the same fluid dropped from differently-formed vessels will vary considerably in size. This is especially important when the substance to be measured possesses such abnormally-powerful qualities. Even using it in a more dilute form would be an improvement.

When gelatine was first introduced as an addition to the developer it was termed the "gelatino-iron developer," regardless of the circumstance of the gelatine being altered by sulphuric acid, or added in its unaltered condition. Ammonia was originally used to neutralise the acid; now it is zinc, and it is re-christened "collocine." The name is, perhaps, an improvement; but developers so made cannot be said to be incorrectly designated if alluded to by the first name. Although, as Mr. Brooks remarks, "collocine" is not "gelatine"—a fact, I should say, most people know—still a developer containing it would be fairly classed amongst the "gelatine" developers.—I am, yours &c., Edward Dunmore.

29, *Torriano Avenue, N., July* 15, 1876.

INSTANTANEOUS PHOTOGRAPHY.

To the Editors.

Gentlemen,—In The British Journal Photographic Almanac for the current year (at page 33) I read:—

"If, then, instantaneous photographs worthy of the name be wanted, in which the definition will be as good as if the lens had been 'stopped down,' it is to this ingenious invention of Professor Smyth that all eyes must be directed. Beautiful in principle, it is correct in practice; and before the year 1876 shall have advanced many weeks I shall have had a portable quarter-plate camera properly fitted with this valuable invention, by means of which, and the exceedingly sensitive dry plates which may now be so easily prepared, I hope to be able to take views in the twelfth part of a second which shall be so sharp to the edge as to bear being enlarged to 12 × 10 inches without apparent loss."

I have been anxiously—I will not say impatiently—waiting for your report on the performance of the above arrangement, as I had hoped (had it succeeded) to have been able to get a twin lens stereo. camera

fitted on the same principle; for I confess I still retain a craze for stereoscopic views, and verily believe if first-class instantaneous stereos. could be readily produced this beautiful and much-neglected class of picture would once more become deservedly appreciated and popular, as it is the only kind of picture that gives the verisimilitude of an object. Your article in the last number of the Journal, on *Instantaneous Photography*, which I have read with great interest, I regret to say contains no mention of, or allusion to, Professor Smyth's invention; hence I infer from your silence on the subject that it has been already put to a practical test in the field and "found wanting."

Should such be the case, I feel assured many of your readers would be glad to learn the cause which led to its abandonment.—I am, yours, &c., SYNTAX.

July 18, 1876.

THE EDINBURGH PHOTOGRAPHIC SOCIETY AND MEDALS.

To the EDITORS.

GENTLEMEN,—I find a letter in your last number entitled *Edinburgh Medal Awards*; and, as Mr. Williamson in that letter has done me the high honour to mention my name, allow me to make a few remarks on the said production.

Mr. Williamson introduces himself as "an amateur who knows nothing, and desires to know nothing, of the unfortunate differences which have of late arisen in the Society." This avowal of ignorance may serve as some excuse for the nature of his remarks, which abound in groundless insinuations and assertions, embodied in somewhat intemperate language; but it might have been more seemly if Mr. Williamson's ignorance had found a counterpart in Mr. Williamson's silence. The utmost courtesy cannot admit that ignorance of a subject qualifies a man to speak about it.

Note these three points:—First: his letter gives a travestie of your editorial remarks upon the subject of medals, to which you have already sufficiently replied. Second: he says—"I attentively listened to Mr. Neilson. Imagine my surprise when I found at the conclusion of a speech which most certainly contained but little of what he professes to give as the substance of it in your last number," &c. He here insinuates that my remarks published in your Journal as being *bonâ fide* made at a meeting of the Society are not *bonâ fide*. One would have expected that a man of candour, finding the apparent discrepancy alluded to, would have made some small inquiry on the subject, when he would have learned that my published remarks were not made at the meeting on the 3rd July, at which Mr. Williamson was present, but at a prior meeting on the 21st of June, at which he was not present. At that meeting I moved that there should be no medals, but finally agreed, for the sake of peace, to a compromise that there should be no local competition. Third: Mr. Williamson cannot see why, if competition be not allowed among the members of the Society, men from Timbuctoo should be allowed to compete. I beg to inform him that competition among the members is calculated to introduce discord into the Society, which could not be introduced by his friends from Timbuctoo, however many medals they might obtain.

The remarks of Mr. Williamson on these three points illustrate how, when a man is trying to say smart things, he may wholly overlook the consideration which is connected with being correct.

Mr. Williamson says that in my published remarks I talk sneeringly of the "well-drilled" opposition. Even in this he is mistaken. I did not use the expression sneeringly, but, as stating a matter of fact, concerning which I must say a word or two. There has of late arisen in the Society a very small party bent on introducing medals at all hazards and by any means, to which fact the records of the Council can amply testify. Under the auspices of this small party a number of faces, formerly unknown in the Society, appeared at the meeting on the 3rd July. Among the number was Mr. Williamson; for, though he may possibly have two or three times attended meetings, he was before the 3rd July practically unknown as a member. I, who have regularly attended the monthly meetings, never heard of nor saw him before the latter date.

Mr. Williamson says he received notice of "what was going on" (the meeting was to be held on Monday) late on Saturday; and then, as by his own account he was entirely ignorant of the state of affairs, he was no doubt duly manipulated for the occasion by the gentleman who, "beating up for recruits," kindly called on the said Saturday to enlist and enlighten him. That the unknown men were "well drilled" was established by the fact of their hooting and howling whenever any of the opposite party rose to speak, and repeating the same in chorus at every sentence. The hooting and howling was wholly confined to the unknown men and their worthy fugleman. I admit that the other party used some strong language; but some allowance must be made under such circumstances. A man cannot be expected to be altogether cool and calm when he is persistently pelted with mud.

There are other statements in the letter which could not stand inspection; but, as I am not an amateur, Mr. Williamson must excuse my not spending more time on him. I can merely say that the pert and flippant style suits well with the spirit of reckless assertion which pervades his epistle.

In conclusion: one cannot help wondering a little that a man who glories in his ignorance of the subject at issue should thrust himself before the public as an authority.—I am, yours &c.,

Edinburgh, July 17, 1876. W. NEILSON.

To the EDITORS.

GENTLEMEN,—I have carefully looked over the prize list for the exhibition at Edinburgh. I do not complain about the medals, &c.; but there are so many things done to negatives nowadays inconsistent with pure photography that I venture to suggest the advisability of offering a prize for the best untouched photographs. I mean that the negatives shall be absolutely free from what is known as retouching, modelling, &c. It would be a very simple thing to make it a condition that the negatives be forwarded along with the pictures exhibited, when the judges would be able at once to see the honesty of the work.

I know the retoucher can so alter faces as to appear as if they were pieces of marble photographed. Not long since I was in the workroom of a retoucher for the trade, when a 12 × 10 negative was brought in, with instructions to "do it" extra, as it was for an exhibition. The retoucher put it aside with the remark—"There's a good day's work at that, anyhow!" I want to know how the finished picture could be considered a fair representation of the exhibitor's work.

I have never yet exhibited; and, though I may cut a sorry figure, I will freely be one to compete for a prize, or for honour, if the competitive pictures are to be pure and unadulterated photographs.—I am, yours, &c., NATURAL.

Bolton, July 18, 1876.

CAMERA WITH SWING BACK.—At a late meeting of the Photographic Section of the American Institute, Mr. Anthony remarked, in connection with this subject, that he saw by the journal of the Photographic Society of France that a gentleman presented to the Society a camera with a swing back simliar to that used in the "success" camera-box. It was regarded as something new, and its exhibition was received with much *éclat*. Now he wished to say that this construction of camera was nothing new in this country, as he had been manufacturing them for years past. He had sent to the Secretary of the Photographic Society of France his catalogue of articles that were used in America, so that the French photographers could become posted in American apparatus.

SKILL IN PRINTING.—Printing has long been considered the most mechanical part of photographic work. It may be made purely so, thereby producing work of all grades and qualities according to the conditions to which it may be subject. On the other hand, it may be made as artistic, and as productive of uniform results, as any other work in any department of photography can be. A mere mechanical printer will treat all negatives alike; the weak, the intense, the clean, the streaked—all are printed on the same paper and subjected to the same treatment. The result is that there are as many varieties and qualities of prints as there are varying circumstances of light, shade, subject, chemicals, &c., under which the negatives were made; for in this case the prints are but a reflex of all these uncontrollable variations. With the artistic printer this is all changed. He expects variety in negatives, and proceeds accordingly. He studies their qualities, retouches and masks, if necessary. He prepares his paper to correspond with the varying conditions of the negatives; he prints from each negative according to its individuality; he masks one part of the background and prints in deeper on another part, as may be required to give the best effect; he tones down the intense lights of the face or drapery by exposing those parts while the rest is protected; and in various ways controls the work as it progresses, so as to produce the best possible result. Printing in this way is as much an art as that of negative-making, and requires as much study and well-directed skill to do justice to the work.—*Phil. Phot.*

ON THE SILVER BATH.—In a recent number of *Anthony's Photographic Bulletin*, a correspondent (Mr. A. Buell Coe) makes the following observations:—Some (favoured) operators are continually tantalising their brethren by their how-to-do-it, which amounts to a simple letting alone of the bath and the bath will let you alone, carrying the idea that it may be worked an indefinite length of time without any change whatever if simply used for the purpose originally designed; but we all know that a continued immersion of plates coated with a film of a character easily detached or separated in minute quantities will, if not of the precise character of the fluid, in a longer or shorter period, according to the amount of work done, change the properties of the bath to the degree of utter confusion and failure, if not corrected and purified. As I have been successful in the use of my formula I give it, and hope it may be of benefit to some one. When I detect any impurity by which the nature of my bath is changed I make a fifty-grain solution of permanganate of potash in distilled water in which ten grains of cyanide of potassium have been dissolved. Drop this into the bath until a faint rose tinge appears, and then set in the light. I do not wait for sunshine, but take a rainy day for it, when I do not expect customers. In a very short time every particle of organic and foreign matter will be precipitated, leaving it so pure as to almost look blue; and then, if you wish to rid it of alcohol and ether, bring it to the boiling point,

cool, and acidify sufficiently, and I warrant you a bath which will produce finer results than before. I am positive a bath can be worked nearer the *alkaline side* of neutrality with my formula than if neutralised with bicarbonate of soda or ammonia, and the advantages of such a bath—whether proceeding from the use of a collodion containing free iodine enough to liberate sufficient nitric acid in the film to prevent fog, or whether the character of the bath will admit of being worked with a neutral collodion by the addition of permanganate of potash and cyanide—are manifold. I have had the bath now in use over fourteen months, in as nearly an alkaline state as possible, and in that time have never had a plate fog, and have treated it to the permanganate solution but twice. During last winter I have had more children's pictures to take than adult's, and, although my light is extremely small, I have failed but once in securing good negatives, attributing my success te a quick-working alkaline bath.

EXCHANGE COLUMN.

ANSWERS TO CORRESPONDENTS.

☞ *Correspondents should never write on both sides of the paper.*

R. A.—Mount the pictures with good Scotch glue.

Rus.—The letter cannot be admitted, as it savours too strongly of personality.

D. S. E.—Black's "acid bath" consists of a twenty-grain solution of silver, to which nitric acid is added in the proportion of an ounce to every four quarts.

T. B. Patterson.—We have referred to the handbook upon which you have animadverted with so much bitterness, and find that the author is quite right, and you, of course, quite wrong.

A Heliographer.—You are wrong. A finished print is not the same size as the negative, in consequence of the expansion and contraction of the paper by the water in which it is toned, fixed, and washed.

Inquirer.—Float the paper on a solution composed as follows:—

Serum of milk	10 ounces.
Iodide of potassium	1½ drachm.
Bromide "	½ "

Dry, and when required for use sensitise in the usual manner and expose while still damp.

The Mezzotint Vignette.—We have received a large number of letters on the subject of the mezzotint vignette, patented by Messrs. Brown and Barnes, and described in our last number. Some of these we have published (see preceding pages); the others we must acknowledge *en masse.* "A. B. C." (Stockport) encloses two *cartes* printed more than two years ago. One of them has a stronger resemblance to those of Messrs. Brown and Barnes than any others hitherto forwarded to us, the portrait being a vignette. "The background negative was obtained," he says, "from the cover of the *Autotype Manual*, and the idea was suggested by seeing some portraits in the specimen case of Mr. Warwick Brooks, of Manchester."——"T. H. S." (Shanklin) encloses two cameo portraits printed in a style he adopted sixteen months ago. One is "solid," the other being vignetted. Both have the granulated surrounding described in our "append" to Mr. Turnbull's letter.——Mr. W. H. Wells (B. Salterton) says:—"I have for some time been using negatives of matt or granular surfaces for double printing round vignettes, although I have not employed leather. I want to know if am expected to give up my practice unless I take out a license? or does the patent only apply to leather? I take it that for such a trifling invention—which, I have no doubt, hundreds of my brother photographers have discovered as well as myself—it is harrassing to find men taking out patents. I should be afraid of ridicule to give such a thing the name of 'invention.' I call it simply a 'dodge;' and if such things are to be protected I could easily become a patentee for lots of similar things."——Another correspondent, "R. A." (Hastings)—who has forgotton to enclose his card, according to our instructions—states that he, too, has long since produced portraits of a kind similar to that described in our last.——Mr. S. Wolstenholme (Blackpool), after having a quiet "pitch into" Mr. Brown on account of an article contributed to our Almanac for 1874, entitled *How I Nearly Became a Great Inventor*, speaks of this gentleman having at last become such an inventor. "But," continues he, "I rather fear that his invention is not very new, as I, and I daresay every one of M. Lambert's licencees, will remember that the way he (M. Lambert) produced his imitations of Vanderweyde effects was by printing around a vignette with a negative taken from a piece of morocco leather. Now if the 'fake' of Mr. Brown is to be considered a valid and *bonâ fide* invention, I wish to say that I have done a similar thing years ago with negatives taken from printed calicoes, showing promiscuous designs in pin work, engravers' stipples, &c., and, to prevent other patents being taken out, will name one or two other substances that might be made the subject of patents by some unfortunate inventor. The following are two or three things I will name as suitable to form the basis of a patent. 1. A negative taken from a large piece of glass stippled by a painter with dark paint and a large brush. 2. A rough cast wall—that is, a wall plastered with mortar, and then, while the mortar is wet, covered over with small pebbles. 3. A negative taken from the back side of a hard oatcake. I name the foregoing three things for fear some person might take it into his head to patent them. If any one think they are worth anything, he may send two guineas to the treasurer of the Photographers' Benevolent Association as a sort of acknowledgment."——We are also informed by Mr. A. L. Dowie (of Barnes) that he also printed pictures of a similar kind, the granulated negatives for the purpose having been taken for him by Mr. Alexander Taylor, of Dunfermline.

Geo. Henry.—Do not wash your plates *quite* so much. If each plate be allowed to remain in each of the two washing baths for three minutes, and then subjected to the stream of water from the rose jet for one minute, no further washing will be required.

G. V. (Strand).—It will be much more convenient if you take both the gallic and the pyrogallic acids with you to the country in the form of very strong alcoholic solutions. The best kind of bottles in which to keep them are those having a partially-grooved stopper, and which have been prepared to be used as dropping-bottles.

Quercus.—Any of the lenses in the first group will answer your purpose; *none* of the others will do, as they are too slow. The best kind of lens of all is one which is not down in your list, viz., a *carte* lens of large aperture. One of two and a-half inches or more in diameter, and five or six inches in back focus, would prove very useful for the purpose intended.

T. G. W.—The front lens of the combination for enlarging need not be large—one of about one and a-half inch in diameter will prove sufficient; but it will be absolutely necessary to have a back lens of at least two inches in diameter, otherwise the whole of the picture will not be included. The reason of this will be apparent if you make a drawing of the condensers, the negative, and the objective, all accurately measured, the latter being placed at its proper focal distance from the negative, and then draw lines representing the cone of light transmitted through the condensers.

An Itinerant.—An excellent method of packing dry plates was pointed out a few years ago by a correspondent of this Journal. It consisted in slipping upon each alternate plate of the package little corner pieces of leather cloth or india-rubber cloth. These pieces are slipped on like a cap. It is evident that by an arrangement of this kind a large number of plates may be packed in such a manner as to occupy very little bulk, and this, too, without any danger of the film of one plate coming in contact with either the front or back of a contiguous plate. It is not even necessary that each alternate plate should be thus capped, for, as one such plate will afford protection to the films of two others, four of them will suffice for a dozen plates. We are not aware of any better means than this for storing a number of plates in the smallest amount of space, unless it be by slipping over the ends of the plates india-rubber bands of moderate thickness. With this, as with the other arrangement, one plate thus fitted will protect two other plates.

Received.—H. Ross; J. Y. (Manchester); S. B. H.; A. Marschall, and others. In our next.

"The Unique Dry-Plate Box."—Under this title Mr. J. B. Payne, of Manchester, has had constructed a dry-plate box which, in being undoubtedly "unique," is certainly deserving of the designation selected for it. In form it is like a book having twelve leaves, the dimensions of the cover and leaves slightly exceeding those of the sensitive plates. It might, probably, be more correct to describe it as an album, on account of the thickness of the leaves. Each of these is, in reality, a frame having a rebate in which is placed the sensitive plate. It is obvious that when these frames have received their supply of plates any one of them can be removed with the greatest ease, or be transferred to the dark slide of the camera. The frames are very rigid and light, and when the book is closed there can be no access of light to the plates, this latter proviso being rendered still more certain when the book is placed inside a case provided for the purpose. This unique box will prove very useful as a handy means of enabling a photographer either to store in his laboratory or to take with him to the country a supply of plates ready packed up in an accessible and convenient form. It may be seen at our Publishing Office.

LONDON GAZETTE, *Friday, July* 14, 1876.

Partnerships Dissolved.

Taylor Brothers, Fox and Co., Lewisham, photo-mechanical printers; as far as regards A. Taylor.

Tuesday, July 18th, 1876.

Williams and Mayland, Regent-street, Middlesex, photographic artists.

METEOROLOGICAL REPORT,

For the Week ending July 19, 1876.

Observations taken at 406, Strand, by J. H. Steward, Optician.

These Observations are Taken at 8 a.m.

July.	Bar.	Wind.	Wet Bulb.	Dry Bulb.	Max. Tem.	Min. Tem.	Remarks
13	30·41	W	59	68	87	56	Hazy
14	30·44	E	64	72	89	60	Hazy
15	30·44	W	67	73	92	64	Hazy
17	30·23	W	68	77	92	63	Bright
18	30·28	SE	60	65	83	53	Hazy
19	30·08	N	63	70	—	62	Cloudy

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THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 847. Vol. XXIII.—JULY 28, 1876.

ON CERTAIN DEFECTS IN BINOCULAR PORTRAITS.

We were visited a few months ago by one of the professors of a continental university, who, in the course of conversation, complained of the great difficulty he had encountered in obtaining a stereoscopic portrait of a particular person, the special arrangement of the subject being that showing the full face. The defects always occurred in connection with the eyes, the inclination of which it was desired should be as if directed towards the observer, but which intention could not properly be carried out. The drawback in all the pictures was, as we have stated, connected with the delineation of the eyes, for in no case were they a true representation of those of the living subject.

Since the interview with our continental friend we have bestowed much thought upon this subject, and have arrived at the conclusion that, with one of the ordinary twin lens or binocular cameras in common use for this purpose, it is impossible to obtain a satisfactory or even correct portrait in which the visual organs will be naturally directed towards the spectator. We have recently taken several such portraits, and not only can we attest the accuracy of this surmise, but we are also enabled to suggest a remedy.

It is an indispensable condition in portraiture that, if the eyes of the sitter are to be represented as directed towards the person examining the portrait, they must be so adjusted as to look straight at the centre of the lens during the time the portrait is being taken, and the distinction between a portrait thus obtained and one in which the eyes of the sitter have been fixed upon an object a little to one side of the lens will speedily be detected by a close observer.

It is almost invariably the case that when a binocular portrait is being taken the sitter will fix his or her eyes upon *one* of the pair of lenses with which the camera is fitted, and in the print from a negative thus taken only one of the portraits will fulfil the desired condition; it will represent the sitter's eyes as looking intently towards the spectator, while its companion picture will show a deficiency in this respect. The *rationale* of this is obvious: while the axes of both eyes correspond with that of one—say the right-hand—lens upon which the eyes are fixed, both eyes, from the point of sight of the left hand lens, are looking in a different direction to the extent of two, four, six, or eight degrees according to the proximity of the camera and the distance at which the lenses are mounted apart. Hence, when the right-hand portrait is correct, its companion picture is incorrect. If the difference were "split," and the eyes directed to a point midway between both lenses, the defect would be mitigated, but not quite remedied. While neither of the portraits would be absolutely correct, neither of them would be far wrong, a residuum of error still remaining.

Absolute accuracy in this matter can only be secured by the eyes of the sitter being directed straight towards the lens; and, as this condition cannot be fulfilled when there is more than one lens acting simultaneously, the inference is obvious—the old method exclusively adopted before twin-lens cameras were introduced must be reverted to, namely, one picture must be taken at a time, and the eyes of the sitter, without any motion of the head or body being permitted, must be intently directed towards the lens on both occasions. This is the condition to be fulfilled if a perfect portrait possessing this characteristic be desired.

We have taken a number of portraits under the circumstances just described, with a view of testing the accuracy of the system, and, when employing a pair of portrait lenses of short focus mounted three and three-quarter inches apart from centre to centre, and bringing the camera so close to the figure as to obtain a bust of the sitter, the difference is so marked that the observer can immediately distinguish between portraits taken simultaneously when the eyes were directed towards one only of the pair of lenses employed and those taken consecutively when the eyes have been directed towards each lens in succession. We are here assuming that the camera is fitted with a pair of lenses, but that one of them is capped while the other is being used, and *vice versâ*.

It may be objected to this method that the sitter is compelled to remain motionless for double the period required when taking a portrait in the usual manner. This is quite true; but, when it is borne in mind that such portraits are taken with short-focus and quick-acting lenses, it will instantly be perceived that the duration of the double exposure does not exceed that required for obtaining a *carte* portrait in the ordinary way.

It must not be understood that in this article we are advocating a return to the Latimer Clark, or uni-lens, camera for every purpose. On the contrary, for *every* object contemplated in connection with both landscape and portrait photography, save for the one purpose here clearly defined, the binocular arrangement of stereoscopic cameras possesses inestimable advantages over the monocular. For securing, however, the highest and truest class of portrait, in which it is desirable that the eyes should be directed towards the spectator, the monocular arrangement, as we have described it, *must* be adopted.

MR. WARNERKE'S METHOD OF MAKING AN EMULSION.

In describing, a week or two since, Mr. Warnerke's method of preparing his sensitive tissue we had occasion to mention the method he employs in the production of his sensitive emulsion—a method which, though not altogether new, is to a considerable extent different from the course generally adopted in the formation of what is now known as a "washed emulsion." The difference consists in treating the collodion (bromised or bromo-iodised, as the case may be) with a solution of silver nitrate similar to the ordinary bath for negatives, after it has been poured out and allowed to "set," in place of adding the sensitising salt and forming a preliminary emulsion in the usual way. This plan—which, in some respects, possesses distinct advantages—was first described by Mr. H. Houlgrave, a member of the Liverpool Amateur Photographic Association, early in the year 1874, and very shortly after the first publication of the washed emulsion process. It has also, very recently, been mentioned by Colonel Stuart Wortley in a communication to the Photographic Society of Great Britain.

As we have employed this modification on numerous occasions, chiefly in cases where its nature rendered it peculiarly valuable for

experimental purposes, we have gained some knowledge of its uses, and can speak from experience of its various advantages and disadvantages; and, as the public taste at the present time appears to be in the direction of washed emulsions, we may be excused for once more venturing to describe what may by some be considered the simplest way of attaining that object.

We may, first of all, point out where this method offers advantages over the original one, and in doing so shall be as brief as possible. Very many of our readers, even now, stand in wholesome awe of the preparation of an emulsion in any shape or form, or, at least, dread the necessary calculations and the inevitable mixing and shaking involved therein. To such the first advantage will doubtless be the avoidance of the preliminary emulsion *in toto*. It is in the preparation of this latter that the "whole art" of the washed emulsion process rests, or at least nine-tenths of it; hence any departure from the usual routine of sensitising, testing, &c., cannot fail to be looked upon with favour. The manipulation of a non-sensitive collodion in the early stage of the operation in place of the highly-sensitive emulsion, as well as the saving of time and trouble in its filtration, will also prove welcome innovations, while the subsequent treatment will be found more in accordance with the practice of non-emulsion photographers.

Passing on to the higher-class considerations—those more intimately connected with the theoretical phase of the question—we should mention the facilities offered for the formation of any class of emulsion quite independently of the haloids employed. Much has recently been written upon the subject of iodide in emulsions, and various opinions have been expressed as to its value or otherwise; but one thing is very certain, namely, that a feeling exists in favour of the presence of at least a small proportion of iodide, where that result can be secured without a great amount of trouble, and without seriously interfering with the working properties of the emulsion. Unfortunately, however, the introduction of even a small quantity of that salt in the ordinary course of emulsification involves a great deal of trouble in the shape of vigorous agitation after sensitising, as well as some anxiety as to the probable result, and perhaps also a little uncertainty; for it must be acknowledged by the strongest supporters of the bromo-iodide emulsion that it exhibits a certain amount of coyness in its behaviour when prepared by the ordinary method. If Mr. Warnerke's plan be followed this uncertainty disappears, as any collodion, altogether ignoring its salting, may be worked upon with equal ease.

Again: with respect to the nature of the sensitive salt formed, the conditions may be considered to assimilate more closely to the preparation of a film formed in the bath; that is to say, setting aside the question of the comparative value of free silver or free bromide, the pellicle is formed in the presence of the former, the outer surface having the whole of its soluble haloid decomposed, while the interior still retains a portion unchanged, which, in the course of the subsequent washing, passes through the outer crust and exercises its beneficial action upon the already-formed silver salts. The effect thus produced is not, however, strictly identical in both cases, but, at least, it precludes the possibility of fog which might arise from unrestrained free silver. Another gain which we have found from actual experience is that this method of forming the pellicle renders us more independent of the pyroxyline; not that the latter becomes an item of *no* importance, but in the washed emulsion processes the difficulty of obtaining a suitable cotton has been frequently urged. In this modification, however, the trouble is greatly modified.

The proverb has it that "there is no rose without a thorn." Let us, then, proceed to indicate the *dis*advantages of Mr. Warnerke's method—disadvantages which, be it said, except to the ultra-particular photographer, will perhaps not be considered of extreme magnitude. First: we must speak of the sensitiveness of the emulsion. This, so far as our experience leads us to judge, is certainly inferior to that obtained by the ordinary mode of emulsification, though not to such an extent as to weigh very heavily in the balance against the present modification. The fashion has unfortunately arisen, of late years, amongst the "advanced" emulsion workers of seeking after an abnormally exalted degree of rapidity, sometimes at the expense of other valuable qualities. This is gained by "doctoring" the emulsion with acids and other matters, together with free silver, which latter *must* be removed from the film previous to exposure. Now, in face of the palpable fact that such a course of treatment does undoubtedly tend to exalted sensitiveness, we cannot help remarking that for ordinary purposes it is unnecessary and injudicious, as, for all the requirements of everyday landscape work, quite sufficient rapidity is to be obtained without interfering with certainty and uniformity of result or increasing the care involved in working the process. In exceptional cases—such as instantaneous, or at least what are so called, results, or where it is desired to perform feats of legerdemain in the shape of limited exposures—the "doctored" emulsion may, perhaps, be recommended, for exceptional results are only to be obtained at the expense of exceptional care and trouble.

The only remaining point we shall mention which might appear to some, especially established emulsion workers, as an inconvenience or, at least, a retrograde step, is the employment of a silver bath for sensitising the pellicle. We may, however, say that the employment of this method does not necessarily entail the usual round of troubles generally supposed to be inseparable from the nitrate bath; for it must be borne in mind that the thick layer of collodion, before it is used, has to undergo re-solution, hence any stains arising from unequal action, streaks, or pinholes disappear in the operations subsequent to the sensitising, the only requirement being that the bath shall work free from fog. There are certainly minor considerations, which may raise the question of practical utility and economy when viewed from a scientific standpoint; but these will be treated later, and may well be passed over by the non-scientific amateur.

And now to proceed to the practical part of the subject, commencing with the collodion. As we have stated previously, the pyroxyline becomes in this mode of working a less important item than when the ordinary routine is followed; indeed, it may be accepted that any good sample suitable for dry-plate work will produce good results without special treatment. The formula we recommend for a purely bromised pellicle stands as follows:—

Ether and alcohol (in equal parts)	5 ounces.
Pyroxyline	50 grains.
Bromide of cadmium (dried)	50 ,,
,, ammonium	50 ,,

If a bromo-iodised preparation be desired, from ten to fifteen grains of iodide of cadmium may be substituted for an equal quantity of the bromide of that metal; it is not advisable to exceed that quantity, in consequence of its action upon the sensitiveness. It will prove beneficial if the collodion be rendered acid by means of either nitric or sulphuric acid in the proportion of one drop to each ounce, and, when perfectly clear and bright, is to be poured out into a dish with a flat, level bottom.

As regards the thickness of the layer of collodion we can lay down no exact rule, as it may be varied according to the strength of the silver solution employed. Thus, with a solution of one hundred and twenty grains to the ounce, as recommended by Colonel Stuart Wortley, the pellicle may, perhaps, be as thick as an eighth of an inch, but a weaker bath would fail entirely in penetrating to the centre of a layer that thickness. With the strength of bath we employ a much thinner pellicle is recommended; for each ounce of the above collodion we allow about eight square inches of space, which makes a film, when thoroughly "set," of a little more than one-sixteenth of an inch thick. The drying should be continued until the collodion is quite firm to the touch—not leathery, but sufficiently hard to prove to the touch that it is "set" throughout its entire thickness.

No fear need exist that the bath will not penetrate the film, as the solvents retained in its pores will prove amply sufficient to render it quite permeable *if a sufficiently strong solution be used.* If the latter point be not attended to, the whole of the solvents will be removed by diffusion before the action of the silver is completed, and the result will be that the surfaces of the collodion will be blocked by the formation of silver haloid, while a large proportion of soluble bromide is locked up in the body of the mass which no

subsequent soaking can reach. We do not counsel the addition of any extraneous matter, such as glycerine, to the collodion for the purpose of increasing its porosity, as it is a matter of great difficulty to procure such substance of sufficient purity to withstand the action of the strong silver bath with impunity, which latter also, if used repeatedly, becomes rapidly charged with matter which, if not absolutely injurious, must tend to produce uncertainty in its action.

The silver solution needs little special comment. It should, for bromised collodion, be of the strength of eighty grains to the ounce of water, rendered slightly acid, preferably, with the same acid employed in the collodion. For the bromo-iodised collodion a weak bath may be used; indeed it is better, in view of the solubility of the iodide in silver nitrate, to reduce the solution to sixty grains to the ounce. If the bath be used a second time it will, of course, be necessary to make it up to its original strength; a simple calculation will give a closely approximate idea of the quantity of silver necessary. One of the effects of a too weak bath, we may mention in addition to the one given above, is that the soluble haloid, in consequence of the mutually-repellent character of the unevaporated solvents and the bath solution, makes its way out of the pores and is converted *outside* the film. It is advisable, in case the solution is to be used more than once, to keep it in an open vessel, or, better still, to boil it for a short time in order to drive off the ether and alcohol which, it must be remembered, accumulate much more rapidly than in a bath employed for ordinary purposes, and if present in too large proportion would exercise a solvent action on the collodion, besides being otherwise objectionable.

We cannot speak greatly in favour of the practice of repeatedly using the same bath, for reasons which may be gathered from what we have already said, and which may be summed up in one word—"uncertainty." Here, unfortunately, arises one of the objections to this method—it is quite impossible to use a solution containing just the calculated quantity of silver to fully sensitise the quantity of collodion under treatment; because, as the bath becomes exhausted, its power of penetrating the film would be decreased at the very time when it should rather increase in order to overcome the retarding effect of the silver bromide already formed in the pores of the collodion. Hence it is necessary to employ a considerable excess of silver, which, if the solution is to be made use of only once, must of necessity be recovered by reduction, as it would be obviously unwise to put it to any other use. These are, however, considerations which weigh rather with individuals than with the mass, and may probably be found not to interfere with the requirements of many amateurs.

The subsequent treatment of the sensitive pellicle is very similar to the other mode; the action of the bath being complete, it is only necessary to wash away the excess of silver and dry. To judge when the action is complete, break off with the spatula a small piece of pellicle and examine the fracture, when the extent to which the silver has penetrated will be distinctly visible. Soaking the pellicle in solution of bromide of potassium is unnecessary, and, moreover, prolongs the washing if a sensitive emulsion be required. A much better plan is to leave a small proportion of the soluble bromide unconverted, and let it perform the necessary action as it passes through the film into the wash-water. We do not advise the adoption of the final wash in alcohol in order to save desiccating the pellicle, for reasons which we have on more than one previous occasion expressed, though in special cases it may prove a convenience.

RECENTLY PATENTED INVENTIONS.

No. XII—PHOTO-PLASTO-GRAPHICAL NEGATIVES.

Whatever opinion may be formed by the reader as regards the novelty of the invention about to be described, there will at least be no doubt as to that of the above addition to our photographic nomenclature. It (the name) is the invention of Herr Adolf Hommel, of Hanau, Prussia, whom we now introduce as the inventor, or, more correctly, the patentee, of a method of taking negatives which, in many instances, may prove beneficial, and which is certainly not surrounded with any special difficulties.

In order to make the invention of Herr Hommel clearly understood, we are compelled to take the liberty of reminding our readers that they produce their negatives upon a film of collodion spread upon one side of a plate of glass. With this as a substratum of information for what is to follow we now point out the nature of the invention for which letters patent have been granted.

Instead of confining himself to spreading the collodion film upon one side of the glass only the patentee coats *both* sides of the plate, and by so doing obtains two images—"one in the recto or front, and the other in the verso or back."

This double negative, produced at the same time upon both sides of a glass plate, the inventor designates a "photo-plasto-graphical negative," and the copies or prints obtained from such negative he terms "photo-plastographs." Herr Hommel is of opinion that by producing a negative on one side only of a glass plate, as at present done, "there is a great loss of light reflected from the person or the object traversing the sensitive skin of collodion; and, even if the negative image furnish good and receivable copies, they have to be reinforced or strengthened by chemical reagents—an operation which produces well-known differences requiring artificial aid or retouching."

The patentee claims the essential advantages of the invention to be as follow:—

"1. I receive upon the sensitive skin of collodion in the verso or back of the glass plate the light which is traversing the skin of the recto or front, thereby rendering it efficacious, and thus I obtain from the person or from the object a maximum effect of the light upon the glass plate, and I do not alter or destroy by an ulterior working the harmony between light and shadow.

"2. The supplementary negative upon the verso or back of the plate receives by the refraction of the rays of light traversing the plate a small enlargement, which has the advantage that in copies of the negative the sharp outlines or contours on the recto or front of the plate will be diminished and rendered softer, and thereby obtain without retouching very soft copies of perfect images which cannot be produced in any other way than in that hereinbefore described.

"The copies taken from a photo-plasto-graphical negative will be made by employing a dispersed light, the light rays falling nearly vertically upon the plate, and the production of photo-plastographs by superposing two or more negatives prepared in the hereinbefore described manner are the results of this invention."

As respects the novelty of the above invention, we very well recollect publishing, precisely ten years ago, an account of the method adopted by Professor Piazzi Smyth for collodionising both sides of his plates when photographing the pyramids of Egypt; and there are few readers of this Journal who are not aware that three or four years ago, when there was much said concerning "Dernier effects," one of the methods published at that time by which such effects could be obtained was the same as that for which a patent has now been secured. Further comment will scarcely be required.

No. XIII.—A PRESS FOR BURNISHING PHOTOGRAPHS.

In the following invention by Mr. Thomas Lyon Taylor, of Chester, for which provisional protection only was obtained, the principle of elasticity by means of india-rubber has been applied to the hot burnisher, so as to admit of cards of different thicknesses being transmitted through the burnisher without the necessity for making a special adjustment for each. It is also directed towards the prevention of lines across the photograph, which, the patentee alleges, are frequently formed with presses as hitherto constructed—a point on which we cannot avoid thinking the patentee is wrong; indeed, in order to test this matter we have, since reading the specification, passed two dozen cabinet pictures through a Weston burnisher, and we fail to discover the slightest indication of the lines of which mention is made. The remainder of the specification we give in the patentee's own language:—

"I mount the cylinder in suitable bearings, which can be raised or lowered by means of set screws, and at the back of the brasses or bearing pieces I insert a piece of solid india-rubber. By screwing down the set screws sufficient pressure can be given to impart the desired glaze

or polish to the photograph or card, at the same time that, if the card or mount should be thicker than usual, the cylinder can give way slightly, and the work will not be injured.

"I make the cylinder or roller of such a diameter that one turn will take the photograph or card through, and I mount the burnishing bar in a transverse slide beneath and give to it an endwise motion across the photograph (that is, parallel with the axis of the cylinder) in one direction only (and not to and fro) during the passage of the photograph or card through the machine. By this means the lines across the photograph, which were frequently caused by the presses as hitherto made, will not be produced, as there is but one steady motion all in one direction during the passage of the photograph, and no dwell or return.

"The endwise motion is given to the burnishing bar by means of an inclined scroll or cam on the axis of the cylinder, which as the latter revolves gradually moves the burnishing bar over the surface to be polished.

"By the time that the bar has reached the highest point of the cam the photograph or card will have passed completely through the machine, and at this moment when there is no pressure the highest point of the cam passes and the burnishing bar is forced back by a spring into its original position against the lower part of the cam ready to commence another operation. Thus each turn of the handle carries the photograph or card through and moves the burnisher once across the surface, and it then returns ready for the next, and so on."

As we have said, the foregoing invention received only provisional protection.

No. XIV.—COLOURING PHOTOGRAPHS.

If Mr. Leopoldo Armanino, artist, of Kennington Park-road, had been at the last technical meeting of the South London Photographic Society, or even if he had purchased a copy of this Journal containing a report of that meeting, he would have been saved the expense incurred in obtaining a patent for the invention which has been enrolled in the patent books under the above heading. At the meeting in question—which was held on the 11th of November, or four weeks previous to the date of Mr. Armanino's application—a picture of the character which forms the subject of the specification now before us was exhibited, and special attention directed to the method by which it had been produced.

We here allow the patentee to describe his "invention" in his own terms:—

"Photographs or photo-prints being rendered transparent by varnish or other means, I take a sheet painted or printed in colours, prepared according to the effect required to be produced on the photograph or photo-print, and affix the same to the back or reverse side of the photograph or photo-print, or I print the photos or photo-prints directly upon coloured, painted, or printed sheets (prepared as above) by means of registering points or marks fixed on the photographic printing apparatus, and I propose to call my process photo-chromo."

To prevent our readers giving themselves trouble in correspondence respecting this patented invention, we may add to what has already been said that as provisional protection only was received this patent has now ceased to exist.

The operation of cleaning plates, though a very necessary one, is certainly not to be reckoned amongst the favourite pursuits of the amateur photographer; neither is it a subject upon which very much can be written beyond what has already appeared over and over again. However, at this season, when, no doubt, dozens of our readers are preparing, or about to prepare, for a few weeks' outdoor work, the plate-cleaning nuisance will be rampant, and divers and various will be the expletives expended thereon. We therefore offer a "wrinkle" which will save not only time, but also an immense amount of trouble, while the temper will retain its usual placidity. Our remarks have, strictly speaking, more to do with polishing than with cleaning plates; but, as the former is, perhaps, the more troublesome of the operations comprised under the latter head, we may be pardoned for using that term. We suppose, then, that the plates have been cleaned by any of the known processes, and require only to be dried and polished; this, where only a few plates have to be treated, may be a light matter, as a considerable degree of care may be devoted to each individual plate; but, in the case of an amateur preparing for his annual tour, with three or four dozen glasses to dry and polish, the trouble commences. After the first plate or two have been dried the drying cloth appears to be useless for that purpose, producing nothing but a series of greasy-looking smears which require a great deal of exertion and "elbow grease" to remove. Add to which, the summer heat and the exertion combined produce in the operator a state of mind and body little calculated to induce favourable results. To obviate this difficulty take a lesson from the housemaid when she is "washing up" the plates and dishes—*use hot water*. After having thoroughly cleaned the glasses place them in a pan of clean, cold water, and have a vessel containing hot water standing ready. As each plate is taken out of the pan to be dried dip it for a few seconds in the hot water and proceed to dry in the usual way. It is not much trouble, but it saves an immense amount of irritation.

DESICCATION OR SCIENTIFIC DRYING.

The cases are numerous and important where the power of *drying* a substance is required up to a given point, even where absolute desiccation is not essential as a final result. Among the latest requirements are the conditions for drying gelatine films and combinations.

The power of the atmosphere to take up water from a mass, or where it seems to form part of a solid compound, is best effected by the usual changes of temperature, aided by temperatures at our command from heated surfaces, where the heat can be regulated from the combustion of gas, spirits, or forms of carbon or charcoal. The common atmosphere has its power of drying dependent upon its temperature, provided it has not already had access to abundant supplies of moisture. The actual affinity of moisture for air seems not easy to define, and the quantity of watery vapour in the air seems dependent upon mere space and temperature; thus the same quantity of vapour can be raised in a vacuum at any given temperature as can be held by the same bulk of air—indeed, if there exist any affinity with air it should be marked in some way; and it is, on the other hand, sufficiently proved that the vapour of water with caloric will rise more rapidly without the presence of air. In fact, the tension of vapour of water by maintained temperature shows it to have the pressure of a gas. The rate of rising of water into air seems to be dependent not merely upon the aid of temperature, but also upon the currents of air that sweep away successive quantities of vapour, and so allow new quantities to rise from the diminished pressure. In nature the quantity of moisture in air is to be ascertained only by experiment. It is true that given temperatures are referred to, but that supposes air to be tranquil or being saturated with as much vapour as can be held by that space. In nature the temperature may be great, but if the atmosphere have passed over barren sands and rocks it may have been robbed of the watery vapour; on the contrary, if over cold regions of mountains, the contained vapour is cooled, as becomes evident by mists, fogs, clouds, rain, snow, and ice, and these conditions exist on the small scale in experimental practice. But in nature, too, it is not necessary that the air should have the absorbing power of heated deserts or the chilling peaks of mountains; but if the wind in its passage go over fresh-water lakes or luxuriant herbage it may be loaded with more moisture than if it had swept over a saline ocean, so that the drying power of the air can be but vaguely estimated beforehand. The practised operator may, indeed, predict from the quarter whence the wind comes with its temperature and the rate of travel that can be ascertained; but the quantity of moisture held or to be taken up must really be estimated by experiment. Five hours, indeed, of good drying weather will effect the desired end better than the baffled efforts of air for many days. What takes place in nature also are the conditions of the little world of the experimentalist. If the air have been at 32° then all its moisture may have been abstracted, and with but slightly increasing and moderate temperature all loosely-held moisture is rapidly taken from substances, and the air or space becomes saturated. If this water can be rapidly removed from the air, the temperature and space being the same, a very large amount of drying power can be effected in such small limited space.

It is easy to arrange a dry heat, say by means of metal plates or tubes heated by the passage of hot air or liquids. The air within a box or space takes up water from any substance until the air is charged; and if ice or any cooling substance, or any absorbing substance with an affinity for water, be placed in the space, then

gentle currents of warm or hot air with its charge of moisture soon rob the body to be dried, and its dampness or water is thus caused to be condensed into liquid and kept retained either by affinity or a low temperature.

As air thus so readily takes up water aided by heat, the drying of substances would seem to be simple enough. On the large scale substances are dried by the atmosphere holding less water than is due to that particular temperature. After some time the air is charged to saturation, and no more can be taken up until that be withdrawn by some cooling or abstracting body in contact with the air. In the hottest weather the air holds the greatest quantity of water, its volume being so enormous that men practically resort to that source of drying as the easiest and the cheapest; but the want of certainty and, indeed, the interference brought about by time render it imperative to be enabled to produce constant arrangements.

The evils produced by time are numerous. With long operations the process of drying fluctuates by the inevitable rising and falling temperatures, and thus the chances are given for the production of decompositions due to each degree of temperature, and, above all, those changes known as "ferments," the conditions of life being thus aided by time, air, efficient temperature, and an atmosphere so gentle as to be free from those disturbing gusts of wind so fatal to microscopic germs. Thus, too, a substance will readily dry up to a certain point, and then it seems to resist all further attempts. The practical man will admit that it makes no progress after days; perhaps he has to admit it is worse. This may be the case when a small quantity of substance or salines having an affinity for water is present; this is concentrated until it holds the water in which it is concentrated with such force that a slight fall of temperature enables it to retake water it has lost. It might have been best dried at the outset by urging the conditions of temperature to the utmost in the early stages, but the prolonged drying always gives the chance of dangerous additions from the floating surroundings. The presence of ammonia and ammoniacal salts is well known in the air of great cities, and with prolonged access of air and temperature few organic substances can resist strange, insidious decay.

It may be useful to take some examples from daily arts. If chalk be crushed and finely ground with water it is fashioned into lumps, and we see it on loose boards or racks with a mere roof, and it soon dries sufficiently to become the "whiting" sold for white-washing and other purposes. Skins and hides are also hung up and dried; so also slabs of glue skilfully set out upon coarse network exposed to dry currents of air and sheltered from storms. Colours may be gently dried in stoves. To these cases I may give the example of lump sugar. The loaves or lumps, as they are called, after draining and drying by air, are well rolled up and packed separately with coats of thick paper. They are then conveyed to the stove and placed on frames or bars of wood, and the stove itself is a brick building (or chamber) with massive walls usually the height of the sugar refinery, and the cubic contents of a large house perhaps. There may be a " cockle," or stove, with fire inside on the base, but usually layers of iron pipes carrying hot water or steam allow the air to be heated from the outside of the iron. A dry heat is thus imparted to the contents of the stove, the outside paper on the sugar is dried, fresh moisture is drawn from the crystalline mass, and thus slowly the enormous lumps of sugar are dried by slow passage of heat into the crystals, and little atmospheres of water rise and travel to the paper, which gives it off to the air; the air gives it to the well-dried mass of brickwork, which allows the water in time to travel away. Here it seems easy to trace the simple process of the merely damp crystals of sugar which hold water between the myriads of small plates and crystals, the dry heat of the stove, and the condensing power of the porous brickwork. The sugar is not safe without exalted heat to expel the moisture; for, although dried, as I have said, by common air, yet the sugar refinery is always much hotter than any dwelling. If the lumps of sugar were once placed in common air and cooled they would attract moisture, and then, instead of mere loosely-held water between the faces of solid crystals, a small quantity of water might drain and collect and dissolve a little sugar; and now it would be rarely the case that this would dry out, but with nightfall and winter temperatures would work unsightly effects, especially if there should happen to be left any of the many salines so frequently found in water, and used in the solutions of the sugar to effect perfect filtration.

In drying substances it is essential in most cases to have the source of heat so regulated as to afford a dry heat. The presence of the results of combustion must be carefully estimated and watched. Substances could simply be dried by being placed in a box or chamber, and the flames of lamps, readily making hot the air and substances to be dried, with spirit of wine, the products of combustion are carbonic acid gas and water. With most other substances there may be smoky flames and the damaging effects of carbon; but in nearly all cases portions of the material itself is volatilised, and so we get oily or resinous matter deposited upon the surface, yielding up the watery constituent.

It is true that forms of carbon and charcoal may be employed; but, instead of their only giving pure carbonic acid and heat, foreign bodies in their substance may cause difficulties. The carbon selected may contain portions that may be distilled over, or it may contain sulphur; and wood charcoal is always liable to the effects of salines that may cause sparks to fly about—sometimes with a sort of explosive violence—to cause alarm, raise clouds of dust, or the projection of the ashes of previously-burnt charcoal. Ordinary wood is found to leave a residue of ash containing earthy salts, generally of lime, with more or less silica and alkali; in fact, rough glass—ashes so delicate that they are easily moved and deposited about by currents of air. But the sparks have great violence, and so for such delicate drying operations the best sources of dry heat are desired.

Many substances are so susceptible of decomposition that they can only be dried by very special arrangements, taking all aid of our knowledge of the affinities of substances for water. Thus most porous bodies, if well dried, will absorb a large quantity of air as well as moisture; indeed, in some cases, the quantities taken up are enormous. The object of obtaining rare substances in a fine state of division or powder is frequently so long and so laborious that these effects are not always fully observed. Thus rock crystal in powder will absorb moisture, &c., and when heated to expel the same the power remains, and, when cooled, can be again employed; indeed, the kind of affinity or attractions are admitted as fact, but no ready explanation to meet all cases. We cannot understand the compound formed by the ozote or oxygen of the air with rock crystal, for example. Charcoal absorbs all vapours more or less, giving off one and selecting others when exposed to airs, gases, and vapours, while the metals platinum and palladium, it has long been shown, will take, when in the powdered state, some gases with intense avidity. Platinum recently prepared and free from oily and other bodies being offered hydrogen will condense it instantly, causing great elevation of temperature; the dust or spongy platinum immersed in a mixture of oxygen and hydrogen gases, or air and hydrogen, will cause the union of the oxygen and hydrogen with intense heat, and water is formed. Now we know nothing of any combination of hydrogen, or even of oxygen, with the platinum on this exalted scale. We know what takes place to a less degree with charcoal, and in a still less degree with other bodies, and we suspect that few instances of porous bodies can be found that will not have a strange sympathy or affinity for some gases or vapours. I repeat we cannot trace the affinity of dry sand for moisture or gases, or the compound formed; but we are now better prepared to follow with care the effects and the decomposition of organic substances.

Some saline bodies are sufficiently well known and cheap to afford by their deliquescent power a good means of drying bodies. Carbonate of potassa, the caustic alkalies, or caustic lime will readily absorb watery vapour; but nearly all these fall short of those prepared for general use by chemists, viz., sulphuric acid in its concentrated form and fused chloride of calcium.

Of late years the question of drying gelatine films or combinations has properly been the subject of attention. Now it has been found that with a gentle heat—say not exeeeding 80° or 90° Fah.—the gelatine can be dried in a few hours; but the good results are not, unfortunately, dependent upon the heat alone, for the previous dryness of the air is an essential condition on the one hand, and the absence of salines and other bodies that may hold or attract moisture to the article to be dried on the other; and if these be substances liable to decomposition then evils are introduced by time, temperature, and long periods of access to air. To dry pure gelatine is one thing; to dry gelatine that containes salines, especially if these be prone to decomposition, is another. It is clear we may have a tough, crisp, brittle gelatine, yet, by the action of solutions and mixtures of salines, the constant presence of salts of silver with organic matter, great changes may be effected. Now we have to deal, not with such compounds, but with affinities so nicely balanced that light must be avoided in the process of drying.

If, in addition to the regulation of dry heat, the water vapour can be absorbed rapidly from the air, the best conditions are obtained. Strong sulphuric acid (oil of vitriol) suggests itself. Its affinity for water is a fact well known to the youngest reader and experimentalist. The necks of bottles, which have had acid once flowed upon the

surface, however carefully they may be supposed to be cleaned, may show at remote periods this inconvenient, constant craving to absorb watery vapour. It requires patience, knowledge, and the proper appliances really to dry up—that is, remove—sulphuric acid once set loose. The rapid and even dangerous absorption of water is also well known. This process of taking up vapour water by sulphuric acid seems likely to aid or to effect the drying of gelatine in many cases. A careful experimentalist found that fifty grains of strong oil of vitriol, specific gravity 1·840, left exposed to the air for four months, then weighed 423 grains, or more than eight times the weight of the acid originally employed, and it was diluted to a density of 1·07. The avidity of sulphuric acid is so great that it soon takes up twice its weight.

It seems to be agreed that sulphuric acid does not give off its vapour at ordinary temperatures. That careful experimentalist, Mr. M. Carey Lea, has prepared delicate litmus-papers, suspended them above sulphuric acid, and found they showed no acid action. It thus may be regarded as a fixed body, yet some words of caution may here be given. If strong oil of vitrol be suddenly mixed with once or twice its bulk of water great heat may be evolved, and then acid fumes may be given off from the decomposition of those acid salines which have been associated with the very formation of the sulphuric acid (by the compound or the union of sulphuric acid with nitrous acid, which decomposes in water, forming sulphuric acid, which remains, and nitric oxide, which flies off). Some of this body and other salts are frequently expelled by this sudden development of heat and the addition of water; indeed, advantage is taken of getting a purer form of sulphuric acid readily by thus diluting it. Great heat is evolved, vapours, as I have said, are given off, and frequently after agitation the turbid mass clears by the substances (chloride of lead and sulphate of lead) that fall to the substances soluble in the strong and less soluble diluted acid. In this way a purer acid can be obtained readily and concentrated if required. Whenever sulphuric acid is employed attention should be paid to the access of organic substances—straw, chips, splinters of wood, floating dust, insects; in fact, nearly every substance of ordinary vegetable or animal origin will have mutual reactions with sulphuric acid; hence it is rarely seen to remain colourless. The acid seeks to abstract water from living or dead organisers; carbonic acid, hydrocarbons, and sulphuric compounds are evolved, and become especially evident if heat be employed, or powerful chemical action results.

Your correspondent, Mr. Lea, suspended litmus paper for days above quiet sulphuric acid; but it will be satisfactory if practice is such as to avoid these actions that are possible and may be probable, and cases may have occasioned suspicion which now may excite closer observation. The action of sulphuric acid, &c., as dryers seem simple enough in practice. A box, a bell glass, or chamber is taken, and these absorbers of water are placed in wide-mouthed vessels or shell trays so as to offer a large surface; then the substances to be dried are placed above (to prevent the inconvenience of acid falling on the substance to be dried if acid were the highest). The watery vapour is soon absorbed, and it is easy to refer to the elegant and perfect arrangement for the production of rare pharmaceutical substances, where the air and vapours are removed by the air-pump, the slowly rising vapour water is aided by the guarded dry heat imparted by steam or hot liquids, and the gentle vapour of water developed at any temperature can be condensed by these means; as water boils at 140° less in a vacuum than in ordinary air, so large and safe drying power is exercised.

Such experiments rarely fail of success; for, if we avoid heat, then the substance is rendered safe and, indeed, is *cooled* by the rapid absorption of the vapour of water when condensed by those bodies that attract water with greater force from the air than the substance to be dried, and so critical decomposition can be limited.

However, I may be allowed to suggest to the experimentalist to entertain the questions of the removal and accidents by the use and presence of sulphuric acid. Accidents and casualties may occur, and it would be well to consider the chances of moving acids about, whether strong or diluted. Sulphuric acid has no respect for persons; for if once spilled on cloths, carpets, or furniture, it is safest to assert that, or suppose, it can never be thoroughly cleaned up. The merest trace will attract water, spread, become acid, and then dampness becomes permanent. Rather prepare to neutralise any acid by carbonate of soda or ammonia than trust to the final removing of acid by mere rubbing and washing on any material being in any way fibrous or porous. The fused chloride of calcium is far more manageable, and can be better handled and protected when out of use. A quantity once employed can have the water expelled, and the substance can thus be repeatedly used.

Mr. Kennett speaks with clearness and confidence of the ease of drying plates. He has an upper chamber with levelled plate-glass bench, and if he require any gentle heat he gets it from gas in a lower apartment, and dry heat from pipes and plates of iron can be delivered beneath his glass counter. He says a temperature of from 80° to 90° Fah. is quite sufficient to dry his plates in three or four hours. Here it is clear that the room devoted to the purpose is a box, and, as the heat is moderate, a previous heating of the room to dry the walls is necessary. Here we get the conditions fulfilled, provided that the air at 80° or 90° at this summer season is not already loaded with watery and other vapours. With pure dry air and non-actinic light we may expect good results; still there may be cases where every condition may seem to be the same and yet obvious decomposition may occur—at least this has been the case. Either the air or some tenant of air has constituted an unstable compound, with strange results, from the same materials, &c., which the day before and the day after were all right. If mere light alone thus destroy the balance of forces, so we may expect such results, however rare, may give evidence of actions not yet understood either by the photographer or the philosopher. So by a guarded heat and dry, pure air we hope with limited time to avoid of slow interferences by time, dust, &c.

The subject of *dust* demands attention. There are some mysterious circumstances and many practical applications which will induce new studies and attention after the results of Professor Tyndall's experiments. As to the dust floating around, and which is deemed by the photographer as merely dust—as merely so much inorganic, inert matter—the Professor has shown us that besides this dust, the result of breaking solid substances, there are nearly everywhere germs of life. He has shown the ease with which air may be purified by filtration, and so to arrest the particles only requiring the conditions of time and surroundings to burst into life. He has proved that, by rest and time, air loaded with foreign bodies may thus be rendered optically and chemically pure by allowing these strange bodies to fall; and fall they will if all currents of air be absent. Then they fall to the bottom of the case and cover the surface of all substances, waiting only currents of air, gentle heat, and appropriate conditions to burst into active life. There is little to wonder at if these happy coincidences may readily be found, and so fermentation or decomposition may take place by the impulse and development of sudden growth of colonies of these emigrants—these colonies of organic dusts and germs.

Drying, then, is as simple as it at first appears. I could urge even a limited atmosphere—limited so as not to have too frequent changes and access to the outer world full of germs; then a regulated source of dry heat to give the conditions for raising vapour; and then condensing that vapour into water by cold at some distant part of the arrangement, as I have said, by cooled substances, or by porous bodies, or the enchaining affinity of acids, alkalies, &c.

Observations show that a small quantity of a foreign body—say of alum, a salt of lime, or of bichromate of potash—may give great hardness and toughness. Hardness may also result from combinations of animal bodies with gelatine. Nature readily from strange mixtures of materials educes skin, hair, horn, hoofs, &c.; and other hard reactions may result from the presence of ammoniacal compounds, or salines attracting moisture and influenced by light and the ordinary changes of temperature. All these are conditions that strongly apply to the practice of drying gelatine.

Those who are engaged as amateurs will find the chance of making good observations, while to others more advanced there is much expected to be learned of the chemical behaviour of the neighbouring atoms to those they employ. The fact that the strongest oil of vitriol, specific gravity 1·900, is actually volatile at ordinary temperatures is interesting. So soon as it has taken to itself a very small quantity of water it becomes fixed at all ordinary temperatures. So also turpentine (and other bodies) with difficulty boils and distils; but with water it mixes and readily distils over at about 150° less than its boiling point, and the water, having then carried, as the workman loves to explain, the heavy spirit of turpentine on its shoulders quietly separates as the fluids cool. Nor is this all; the whole influence of vapours is strangely at variance with mere common sense. Odour will pervade space for years and yet the traced source seems to have lost little substance. The Hon. Robert Boyle weighed musk very carefully; for years it gave its perfume, yet no appreciable loss was discovered by the best balances he could employ.

It is instructive to recall the modes of behaviour of even simple water itself. When I say that at and below thirty-two degrees all water is congealed, as frozen the vapour falls as snow, the fluid congeals to solid ice, yet we know that wet and damp clothes will dry in a cold, frosty air, the temperature being always below thirty-two degrees. The clothes are really dry, only stiff by the interlacing of

the fibres and re-arrangement of salines and gelatinous matters between the fibres of the material. The snow and ice gradually disappear, although day and night the temperature may be much below the freezing point. It seems a pleasant thought that trees and vegetable substances may by an inherent power of life and heat cause the solution of the snow; but no such explanation meets the disappearance of newly-formed snow and ice upon marble and rocks. There is also the educing of dry and hard bodies in the animal and vegetable kingdoms; and even subsoils and geological products are subjects of influences which, when explained, I shall be happy to instance and copy as examples of scientific drying.

T. J. Pearsall, F.C.S.

FOREIGN NOTES AND NEWS.

An Aldehyde Preservative.—On the Use of the Microscope in the Examination of Collodion.

M. Sahler, of Montbeliard, last month, made a communication to the Photographic Society of France on the preparation of a rapid collodion. Some further particulars have been published in the *Bulletin*, from which we find that negatives of remarkable fineness have been obtained with this collodion, containing aldehyde without any preservative solution. The time of exposure required is less than that necessary for a plate prepared with tannin. The image may be developed twenty-four hours after exposure with an acid developer. *Apropos* of this communication, M. Chardon has observed that by immersing some dry bromide plates in a solution of—

Aldehyde of ammonia	5 parts,
Water	100 „

an image is obtained in the camera with twice the rapidity of such plates when used dry, the same developer being used.

An article by M. J. Girard, *On the Examination of the Texture of the Collodion Film by Means of the Microscope*, has been contributed to the *Bulletin de la Société Française*. Such an examination imparts a more perfect knowledge of the texture of the negative than can be otherwise obtained. When collodion is of good quality the glass on which it is extended is translucent and colourless, indicating that the cotton has perfectly dissolved. Some photomicrographs were presented to the Society in illustration of the foregoing.

Some old collodion which gave a fine image, but which necessitated a long exposure, contained liquid bubbles of altered ether. If collodion be too alcoholic it will have the aspect of a cellular tissue; and if it contain water the fibres of cotton appear beneath formed of shapeless tufts. A thick and intense, yet slow, collodion had an appearance of a wavy cellular-vascular tissue, causing a want of regularity in the negative, which was injurious to the clearness of the image.

Among other specimens exhibited were some taken both when the collodion film had not been sufficiently long in the silver bath to have become fully sensitised, and also when a sufficient time had been allowed for that purpose. In the former the oily spots, which are the sign of the unfinished reaction, are filled with striæ and groups of crystals—the striæ being formed in the shape of spires, and the crystals being of an irregular form, contain parts showing very fine details. The crystals of iodide of silver, which were in course of formation, appear as if arrested in their development. In the second specimen, in which the sensibility is complete, the texture of the layer was homogeneous and compact. It was covered with a regular network, made still more evident by several places free from crystallisation. The greater part of the photographic reaction necessary to obtain an image is made by a successive transformation of the crystalline system; the reaction of the iodide of silver is very perceptible. The result of the whole is that the examination of the layer of collodion with a microscope of medium power enables an operator to intelligently understand his chance of success with such chemicals as he uses.

ON LENSES.

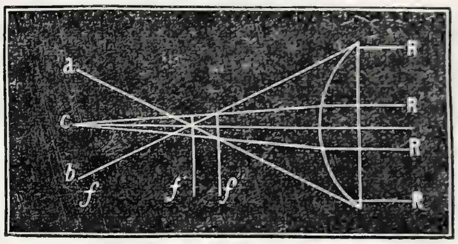
Mr. Joseph Zentmayer, of Philadelphia, recently delivered a lecture *On Lenses* at the Franklin Institute, in that city. The first part—being elementary, and treating mainly on the forms of simple lenses—we have not thought it necessary to republish; but the remainder will, we believe, prove of interest, as it treats upon the aberrations and corrections of lenses.

We come now to a somewhat more complicated and difficult part of the subject—the aberrations of lenses and the modes of their correction. So far we have supposed the lens as very small in relation to its focal length, and that with such a lens all rays coming from one point are refracted by the lens in one point again; but in practical optics such is not the case, as lenses of very large aperture are often required in modern optical instruments, and the rays coming from one point are no longer collected in one point, and this optical defect occasions the different aberrations. For over a century the correction of these aberrations employed our most eminent mathematicians, as Euler, Fraunhofer, Herschel, Fresnel, Littrow, Gauss, Airy, Petzval, and others.

The most important of these aberrations are spherical aberration, chromatic aberration, curvature of field, distortion, and astigmation.

The marginal parallel rays R R (*fig.* 1), passing through a convex lens L, cross the axis at f', nearer to the lens than the more central

FIG. 1.

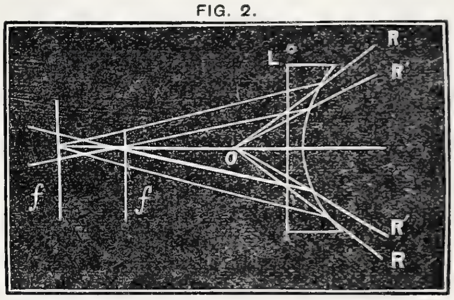


ones R′ R′, which cross at f. This is a result of the spherica- surface of the lens, and is called "spherical" aberration.

If we present a convex short-focus lens to solar rays, and produce a sharp image of the sun on a piece of white paper, we will find that the image at f, which is the one made by the central rays (and therefore is the sharpest), is surrounded by a halo $a\ b$, which is what we call "lateral spherical" aberration. This halo is, as you see, produced by the shorter marginal rays R R, after crossing the axis, diverging, and is also called the circle of aberration; $f'\ f$, the distance of the difference of the central and marginal rays, constitutes the longitudinal aberration. The least spherical aberration is where the two cones intersect each other between f' and f. This aberration is called "positive."

If converging rays R R and R′ R′ (*fig.* 2), which we suppose would be collected in the point o, fall on a concave lens, the marginal rays

FIG. 2.



R R are refracted stronger than the more central ones R′ R′; consequently R R will cross the axis farther from the lens at f' than the more central ones R′ R′, which cross the axis at f. In this case the spherical aberration is of the opposite character, and is called "negative" aberration. It is evident from the foregoing that spherical aberration varies with the aperture of the lens and the material of which the lens is made; therefore, the larger a lens is in proportion to its focal length the greater its spherical aberration. A lens of an aperture of say one-fiftieth of its focal length has no perceptible spherical aberration. The longitudinal spherical aberration increases as the square of the diameter of its aperture, and inversely as its focal length; while the lateral aberration increases as the cube of its aperture, and inversely as the square of its focal length.

Thus, if we have two lenses of the same curvature, made of the same material, but the one of twice the aperture of the other, the longitudinal aberration of the larger one is four times as great, and the lateral or circle of aberration is eight times as great, as that of the smaller one.

If two lenses have the same aperture, but the focal length of the one is twice as long as that of the other, the longer one has only one-half the longitudinal and one-fourth the lateral aberration. As a lens made of a denser medium—say of heavy flint glass or diamond—requires for the same focal length a longer radius of curvature than one made of crown glass, it follows that its spherical aberration is less.

The single lens of ordinary glass having an index of refraction of 1·5 has the form of lost spherical aberration when it is a crossed convex lens with the surfaces of different radii, the proportions of the

radii depending on the index of refraction of the material of which the lens is made. For ordinary glass, index 1·5, the radii are as 1 to 6, the shortest curve towards parallel rays. The best form for a lens made of flint glass, index 1·6, is the plano-convex, and for diamond is a meniscus, of which the convex radius is to the concave as 2 to 5 for radii of curvature.

We see that in lenses of wide apertures the spherical aberration may be considerable enough to interfere with the sharpness of the image, especially if, as in a telescope and microscope, the image with all its errors is magnified by an eyepiece. Let us now see what means we have to reduce, correct, or destroy the spherical aberration. The most simple way is by the use of a diaphragm. A diaphragm is a non-transparent plate, commonly made of metal, perforated in the centre. A B is such a diaphragm; *c d* the aperture of it. If this diaphragm be placed in contact with the lens it is nearly equal to reducing the lens to the size of the aperture of the diaphragm, and, as we have seen before, the spherical aberration is considerably reduced, and the light also. If the loss of light be of little consequence this mode of reducing spherical aberation may be adopted with advantage. Another way of reducing the spherical aberration is by adopting, for a given aperture and focal length, two or more lenses of the same aperture, and the same equivalent focus of the single lens. We have seen before that of two lenses of the same aperture, but their focal length as 1 to 2 to each other, the longer one has only one-fourth of the spherical aberration of the shorter one. Lens M (*fig.* 4) has its focus at *f*. The lenses L and N are of the same aperture as M, but each has twice the focal length of the lens M; therefore each has only one-fourth the spherical aberration of M. But L and M together have the same focal length as M, and, as their apertures are alike, the combination L N has only one-half the lateral spherical aberration of the lens M. But by this mode of correcting it is not possible to destroy the spherical aberration completely, although it is stated in some works on optics that a combination of two convergent lenses was calculated by Sir John Herschel, and said to be free from spherical aberration. This, however, is a mistake, which Herschel himself has rectified in his memoirs.

FIG. 3.

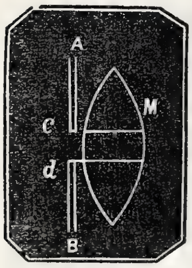
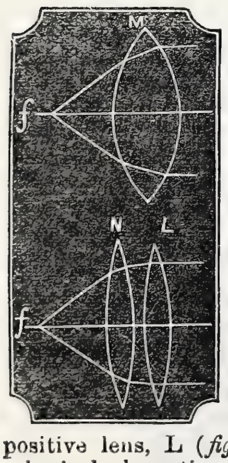
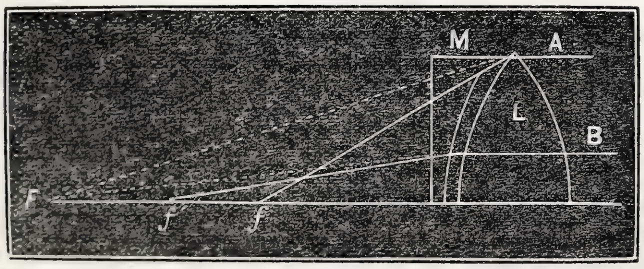


FIG. 4.



We now come to the most important method of correcting spherical aberration, that is, by a second lens of opposite character. Suppose we want to correct the spherical aberration of the positive lens, L (*fig.* 5) along its axis. $f f'$ is the longitudinal spherical aberration of the rays A B, parallel to the axis A, at the margin of the lens, and B near the centre of the lens L. If we combine this lens with a convergent negative lens M it is not

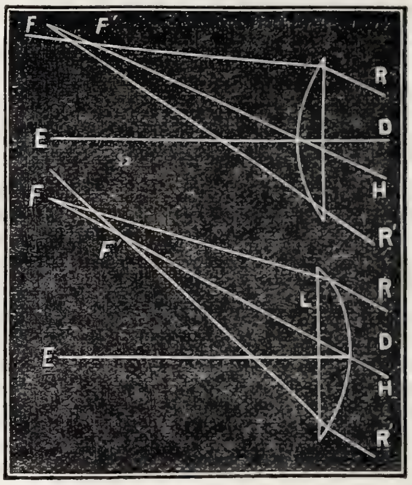
FIG. 5.



difficult to see, by what we learned before, that the lens M has very little power to change the direction of the ray $b f'$, and bring it, say to F, but it will greatly change the course of A *f*, so as to bring it also to F, since the prismatic form is greater at the margin than at the centre. Of course, the form of the lens must be suited to the material of which it is made. For our present purpose both of the lenses may be made of the same glass; but it is much better if the lens M be made of a denser glass, as we shall soon see that the same lens may be used to correct the chromatic aberration also. By this method the spherical aberration can not only be corrected, but the marginal rays can be made to cross the axis farther from the lens than the central ones; in this case the lens is called "over-corrected," while, if not enough corrected, it is called "under-corrected." So far we have considered the aberration of rays parallel with the axis. But magic lanterns, photographic and microscopic lenses include angles from 40° to 175°, and the foregoing is only applicable to a narrow angle near the centre of the lens. If a lens corrected, parallel to its axis, for spherical aberration be struck obliquely by parallel rays, but the longitudinal aberration be different for two diameters, and is greatest in the plane laid through the axis of the lens and the radiating point, the circle of aberration will become the more elongated as the more obliquely and marginally the light strikes the lens, until it terminates in a point at their extreme margin, which is known as the "coma."

L is a plano-convex lens; H F an axis through the optical centre, making a considerable angle with the axis D E. R and R′ are parallel marginal rays. The ray R will cut the axis at F′, and R′ farther off at F, and therefore the image of a luminous point is no more a point, but appears elongated, and in the extreme has the shape of a coma, which in this case is directed downwards. If we reverse the lens, as in the next figure, so that the incident rays fall on the convex side, the coma is directed outwards. We see we have here, by reversing the lens, opposite comas; and by such lenses of opposite character properly combined, at the right distance, and, furthermore, by the use of a diaphragm at the proper place, the spherical aberration for oblique rays can be reduced to a small amount.

FIG. 6.



(To be continued.)

ECONOMICAL SILVER BATH FOR PRINTING.

In a recent number of the *Bulletin Belge de la Photographie* M. Ratti thus gives his experience in connection with this subject:—

The paper which gives the best results is that which is salted and albumenised in only a very slight degree. In summer immerse two or three minutes, and in winter four or five minutes, in the following bath:—

Distilled water	1,000	grammes.
Nitrate of silver	40	„
Nitrate of ammonia	40	„
White sugar	40	„

To keep the bath clean and colourless place in the stock-bottle ten grammes of washed animal charcoal. In order that the bath shall be maintained at its proper strength, after five ordinary sheets have been sensitised it must receive an addition of sixty grammes of a more concentrated bath prepared as follows:—

Distilled water	125	grammes.
Nitrate of silver	12	„
Nitrate of ammonia	5	„
White sugar	5	„

The paper after removal from the bath is suspended in the ordinary way to dry, and is then put in a portfolio containing sheets of black paper. Before being used it should be exposed a few minutes to the fumes of ammonia, the paper being perfectly dry. The proofs, when removed from the printing-frame, are of a fine violet colour, which they do not lose either in the toning or in the fixing baths. The toning bath which I prefer is the following:—

Ordinary water	250	grammes.
Chloride of gold	0·04	„
Acetate of soda	3	„

I leave it for twenty-four hours in a warm place, and it is necessary that it be used while it is of the temperature of about 90°. I pour it into a heated porcelain dish and place the proofs in it after they have been washed two or three times in ordinary water. Stop at the required tint, whether rose, purple, or violet blue; then put the proofs in a dish of water, which should be changed at least once, and then place them in a fixing bath consisting of a ten-per-cent. solution of hyposulphite of soda. A quarter of an hour suffices for the fixing. They are then washed with care in water, which ought to be changed seven or eight times in the course of a quarter of an hour.

ON THE PRESENT POSITION OF PHOTOGRAPHY.

At the time, now more than seventy years ago, when those early pioneers of photography, Davy and Wedgwood, were producing evanescent images by the action of light on leather moistened with a solution of nitrate of silver—or even some forty years later, when Talbot first exhibited his camera pictures—the most enthusiastic admirers of the new-born art would have hesitated to believe in the possibility of its becoming the gigantic commercial industry which it has now been for a considerable period, or in the rapid strides by which that position has been attained.

While the various branches of science and art generally have been of slow growth—in some cases extending over centuries, often standing still for long decades, and not unfrequently suffering serious relapses, and so requiring their votaries to go over afresh the once well-trodden ground—photography, whether regarded in its artistic, commercial, or scientific aspects, has during the little more than forty years of its active existence reached a degree of perfection which, in the opinion of many of its devotees, leaves so little more to be desired that they are fain to fold their hands and "let well alone."

The position of the art, however, is not by any means all that those who love it best could wish. In its artistic aspect, indeed, it has, in the opinion of some, stood still far too long, if it has not actually retrograded; and they point with sorrow to the almost universal habit of retouching, which in too many cases has displaced, by a marbly softness and effeminancy alike devoid of muscle and texture, the vigorously artistic productions of the school of which the late Mr. O. G. Rejlander was the head.

Nor can it be denied that there is some foundation for such a feeling. An examination of much of the portrait work of the present time will make it abundantly plain that, in deference to the wishes of the general public—wishes in too many cases having their origin in ignorance of all that constitutes true art—the desire is more to make a *pretty* picture than to render with force and vigour the stern but noble truth which the camera in proper hands—but in proper hands only—is capable of rendering.

I am fully aware of the oft-repeated truth that the professional portraitest who lives by pleasing his *clientèle* must do all that he can to please; but I am certain that the sincere artist who will take the trouble to educate his supporters to appreciate true art will find, in their readiness to accept art rather than its counterfeit, a much better pecuniary return, in addition to the enjoyment which naturally flows from the knowledge of having done his work artistically.

From a commercial point of view there is also much room for extension. In spite of the vast improvements which have during the past few years been made in the various methods of mechanical printing, publishers, for apparently some almost occult reason, do not avail themselves of it for book illustration to a proper extent. It cannot be, I think, the cost of production which stands in the way, as I have recently seen boxes of matches, the retail price of which was one penny, and for which the manufacturer could not have got more than half that sum, and yet each box had on it two excellent photographs. I am aware of two instances in which the publishers availed themselves of photography, but such was the difficulty in getting what to them seemed satisfactory that in one case a large portion of the edition was illustrated with silver prints, while in the other I am not quite sure that the book is published yet, although its publication was advertised for the middle of May. But these difficulties are simply questions of time and experience, as I am quite certain that the existing processes are capable of giving certainly, rapidly, cheaply, and satisfactorily, almost anything desired by a publisher.

There is another branch of commercial photography which has been very much neglected, viz., the illustration of manufactured articles. Many years ago the Carron Iron Company—who employed a staff of draughtsmen to make drawings of all new patterns of stoves, &c.—discovered that a large saving could be effected by photographing each article as soon as it was finished; and I am acquainted with firms who similarily employ it to a limited extent. But I believe that the pattern-books of Birmingham goods, upholstery, &c., could not only be got up at much less cost by some of the modern collographic methods of printing, but that such photographic illustrations would be found to give a much better idea of the articles offered for sale than that conveyed by the more general method of engraving.

I have left myself too little space to say much about the third aspect of photography—namely, the scientific—although it is in this department that there is probably most room for extended application. I do not now allude to astronomical photography, or to photography applied in the recording meteorological variations or for registration purposes, so much as to the increased employment of it in doing efficiently much that is still done by hand imperfectly. In medical science, especially, photography ought to be of the greatest benefit, and yet it is almost systematically ignored in that direction. It is true that one now and then sees two photographs of a patient —one taken before and another after some peculiar operation had been performed—and sometimes also a photograph of a tumour or unusual form of ulceration; but, generally speaking, the student has to form his conceptions from an imperfect drawing which often conveys so poor an idea of the case represented that he fails to recognise a similar one occurring in his own practice.

In the important interests of pathology and physiology it is not too much to expect that every well-appointed hospital should have on its staff a properly-qualified photographer, with suitable apparatus and appliances for successfully photographing such cases as may be interestingly abnormal or educationally useful. I venture to think that an album of such pictures would be found of more value in the library of the ordinary medical man or on the lecture-table of the teacher than any number of drawings made by hand. The photographs should not be less than 12 × 10 inches, and, as a matter of convenience, should be taken on say 4 × 5 plates and then enlarged.

There is one more suggestion that I would like to make. I was recently consulted as to the best means of reproducing by photography some very fine and perfectly-accurate *camera-lucida* drawings of sections of the ovary. Unfortunately they were made in pencil and were too faint, the lines being so deficient in solidity that it was found impossible to make a suitable negative for the purpose required. Such drawings should be made, not with a pencil, but with a fine-pointed pen, the artist using black ink. With some subsequently made in this way there was no difficulty in getting suitable negatives, and the carbon prints produced from them are in every way satisfactory, conveying a more trustworthy idea of the ovarian structure than it would have been possible to secure by hand-work.

John Nicol, Ph.D.

THE CENTENNIAL EXHIBITION.

In the *Philadelphia Photographer* Dr. Vogel gives his impressions of the photographic department of the great centennial exhibition.

The great International Exhibition is an accomplished fact. All branches of industry from every part of the world have participated in the great centennial festival of America, and the photographers have not been backward. Worthy of the importance of our art, we see for the first time a Photographic Hall constructed, which contains everything belonging to photography—not pictures only, but also chemicals, apparatus, and accessories. It is the first time photography makes its appearance self-dependent—separated from art and separated from industry. It would have been desirable if this separation could have been extended over the jury also, so that photography, with everything belonging, had formed a separate group; but, unfortunately, this was not possible. The exhibition of the Photographic Hall has been parcelled. The pictures are given to the criticism of the jury of art; the chemicals are placed in the group of chemistry; the papers belong to the group of paper industry, and the apparatus and lenses to that of the instruments of precision.

All the photographers have not found a place in the Photographic Hall. The photographs from Australia, Egypt, India, Italy, and Switzerland are exhibited in the main building, and we have trouble to find them; in the division of Italy and Switzerland this is entirely impossible without the assistance of the commissioners. The Australian exhibition contains many things of interest and instruction; the photographs are not the very best, but the exhibition represents a picture of life in Australia which in many instances seems to be similar to that in America, only that there the plastic art, as yet, is far, far in the background. We observe in the Australian division some technic photographical works which almost startle and puzzle us—sharp, mammoth pieces which, notwithstanding several technical defects, deserve to be acknowledged. One of them is the panorama of the city of Sydney, in New South Wales, thirty-one feet in length, composed of twenty-two single pieces, which present an excellent view of the wonderfully-situated city. Opposite this mammoth work there are two other prints from large plates, five by three feet, perhaps the largest negatives existing; and this giant work is the production of an amateur, Mr. Holtermann. He was the lucky finder of a large lump of quartz, containing gold to the amount of $60,000, and we see his portrait in the middle of the compartment, with his treasure beside him. Another picture shows us the gold in large lumps.

We wish, for the interest of our art, that the photographers of Australia may make several such lucky findings, and then we hope they will work with the same passion for our art as Mr. Holtermann, and spend a small part of their gold for chloride of gold for the purpose of the production of photographs.

Next to Holtermann there is another German, Mr. Lindt, who with his landscape photographs gains honour; they are certainly the best from Australia, and some of them show, indeed, real artistic apprehension. As generally known, Osborne's process of photolithography, which at present has a perfect success in America, first saw the light in Australia. It seems as if Mr. Osborne's example is not without some good fruits, for Mr. Sharkey, in Sydney, has sent some very good photolithographs.

Of portrait photographers I can name only Newman, in Sydney; his exhibits are in the Photographic Hall. Besides him there are in the main building many other portrait photographers represented, but without any essentially first-class work. In portrait photography there is much to be done yet in Australia before it will take the high position which America at present occupies. The moon photography, which is taken in Melbourne by means of the renowned large telescope, cannot stand a comparison with Rutherfurd's moon photography. Of more interest are a number (about three hundred) of coloured landscape photographs, by R. Dantree, at Queensland—a man of science, whose pictures tell us more than the best book of geography about the new province in the north-east part of Australia, which is rich in gold, lead, copper, tin, and coal (of which giant lumps are exhibited). Besides these there are many other photographs in the same department; they show us the most ugly faces of the Australian natives in life-size. Another province of Australia is represented, namely, New Zealand. Like a mighty alpine land, with real Switzerland scenery, rises this wonderful island above the surface of the ocean. Hot springs flow out of the earth, and flourishing cities are springing up. Of all these wonders photography gives an interesting picture. We see the ice-mountains of the high land, the geysers, and surprising is the similarity of these photographs with those of the Yellow-stone River in Colorado, which Mr. Marshall has exhibited in the Photographic Hall. We almost imagine we see the same scenery.

From Australia to Japan is on the map only one step, and the same it is in the main building. There we find innumerable vases, bronzes, lac-work, all very fine and valuable; but Japanese photographs we find only in the Photographic Hall. Baron von Stillfroid has sent a very fine collection of landscapes and scenes of Japanese life, which found its place partly in the Austrian department. China has sent no photographs. The Chinamen are fearing, perhaps, the sharp critic of America. When the German Venus expedition arrived at Chefoo, in China, they met there a Chinese photographer, who took to his heels as soon as he noticed the European colleagues. As afterwards found out, the man had no lens or apparatus at all, but only a number of old negatives in size of *carte de visite*, all portraits of Chinese men and women, which he had bought from a colleague in Hong Kong. When any customer came to him, and ordered his picture, he picked out of the number of negatives one that had the most resemblance to the face of the customer; and this was not difficult, for one Chinese face is just as ugly as the other. He made only prints of the negatives, and they found a ready sale. As I am informed, in Hong Kong there is done at present a good deal in negative retouching; thereby the skill is shown less on the faces, but so much the more on the wigs or pigtails, which are made longer and thicker by means of negative retouching.

From India there arrived only some interesting photographs of architecture, which were sent by the government. Egypt is represented by three very able photographers, whose exhibits are in the main building—especially ought to be named Beato and Schoefft. The latter has taken excellent gems of Egyptian life. We feel a kind of longing to see the wonderful land of the Pyramids when we look at these pictures.

The photographs from Switzerland are also in the main building. There are fine pieces amongst them; but it is a pity the photographs can hardly be found. I name, at first, Taeschler Brothers, in St. Fiden, who have exhibited fine portraits, the backgrounds of which are retouched in the negatives. They take the portrait on plain background and cover the back of the plate with thin lac. On this they draw whatever they think to be proper—trees, walls, sea, clouds, &c.—which are then copied in the portraits and produce a good effect. Of course this kind of retouching work is troublesome, and requires a skilful apprehension. Besides Taeschlers I mention, as worthy of notice, Ganz, of Zurich, and Charnaud, of Geneva. The latter has exhibited a number of very good landscape photographs, amongst them panorama pictures, which are very seldom seen at exhibitions. From Switzerland we count eight exhibitors; but from France only a little more than half the number. I can find no reason for the slight participation of France, for the relations of France and America are intimate enough. The exhibition by Goupil in the main building is grand. There we find beautiful relief-prints, and also specimens of the new heliogravures, though not all of them are beautiful. Braun, of Dornach, has sent nothing; but we find exhibits of Walery and Liebert, of Paris, in the Photographic Hall. Both firms keeps up a counterbalance between them; they are working nearly in the same style, which is taken from Adam-Salomon's. Liebert has sent carbon prints, which at present, in Europe, are coming more and more into fashion, and deserve also the attention of the American photographers.

I cannot forbear observing that there are among the exhibited photographs from all countries many old ones from the Vienna exhibition. Of special interest are M. Vidal's photochromic pictures; but they are not by any means coloured photographs taken from nature, the colour is afterwards put on by means of a chromolithographic or heliographic process. M. Vidal is making at first a pigment print, which is overprinted with colours. This process produces pictures which do not look better than over-painted photographs. Should it be cheap enough, which I doubt, judging by their advertisements, it is possibly of some worth for the reproduction of coloured carpet patterns, coloured jars, and, perhaps, paintings; but the exhibited portraits cannot claim general approbation. It would have been desirable if M. Vidal had sent with the reproduction of an oil-painting the original also; then we would be able to judge better about the process.

Meetings of Societies.

AMATEUR PHOTOGRAPHIC ASSOCIATION.

The annual council meeting of this Association was held on Tuesday, the 18th inst., at 12, York-place,—the Right Hon. the Earl of Rosse in the chair.

The minutes of the last meeting having been read and confirmed, the following members were elected:—Major Chadwick, Capt. Douglas Mac Neill, J. Taylor Smith, Esq., M.D., F.G.S., &c.

Mr. Glaisher again brought forward the question of the revision of the following rule:—"The prize negative shall become the property of the Association; but in any case the proprietor shall be at liberty to decline to part with his negative, whereupon another shall be selected for the prize."

The Secretary explained that this rule (although no instance had occurred of a prize being refused) was felt by many to detract much from the value of the prize received, and that, whilst the recipients might much regret the loss of their best negatives, the Association obtained no corresponding gain, the prize negatives being of no commercial value whatever.

After much consideration it was proposed by Sir Antonio Brady—"That in future the prize negatives, instead of as heretofore becoming the property of the Association, shall be retained for three years only, and then at the option of the owner may be withdrawn; but that the council shall in no case be responsible for breakage, or any injury the prize negatives may receive whilst in their custody."

This resolution was seconded by Mr. Glaisher, and accepted by the meeting.

The Secretary then laid before the meeting the pictures for the current year, but it was found impossible to examine them all with sufficient care to make the award that day. The meeting was therefore adjourned to the following Tuesday. A. J. Melhuish, *Hon. Sec.*

Correspondence.

GELATINE EMULSION PLATES.

To the Editors.

Gentlemen,—As in medicine so in photography—complaints arise mysteriously and prevail at times as epidemics. When such a plague comes upon us we send up a cry of distress through the recognised medium of communication. The cry just now is—"Who shall deliver us from red fog?" That seems to be the present prevailing trouble of bromo-gelatine plates. The cause of it has, so far, evaded investigation, and until that is cleared up there is little hope of finding any certain remedy or preventive.

There is a difficulty in determining at what particular stage of development it is produced. Independently of the dim light in which one has to work, the image so often gets obscured in the process of development or intensifying that it prevents one from seeing the approach of it. I have otherwise good negatives utterly spoiled by these defects in the shadows. Anyone who will conduct a series of systematic experiments, having in view the clearing up of this difficulty, will deserve the thanks of the community.

Another defect in bromo-gelatine plates is the tendency to halation. The cure for this, with other attendant benefits, is to spread it on paper or some base more suitable than glass. It seems to work better, being more readily densified, when some organifier is used.

The objection to beer is its varying and inconstant character, even when in the best condition. Such an empirical mixture, I fear, will never yield plates of a constant degree of sensitiveness, or enable one to fix upon the best formula for development. My own impression is that hops alone are sufficient, and that may be had in extract, convenient for use as wanted.

The changes have been well rung upon ammonia developers, using, in all proportions, both the solution and the carbonate; at the same time the liability to change of strength is an admitted defect of both, leading to uncertain working and failure. Why have they been so long used in preference to the more fixed alkalies? I have recently been using solutions of carbonate of potash and of soda, and even common washing

soda, with marked advantage, finding them more manageable, and thinking also that I get density more readily by their use.

No doubt other workers, like myself, have been lately painfully impressed with another imperfection of the gelatine vehicle. It is hardly to be expected that gelatine can stand with impunity such a temperature as we have had to bear of late. When the process of development has been to the operator "melting moments," and more, it is not astonishing, though it is exasperating, to see a good finished negative transformed into a dirty slime and slide into the sink! Is there no remedy, oh! photographic medicine man? Can we not enable our gelatine to bear a few more degrees of heat and yet not to close and harden the structure too much? How would gum ammoniacum mixed with gelatine in small proportion serve the purpose? It is soluble in a mixture of spirit and water, and may require a little spirit in the developer.

In reference to a discussion on bromo-gelatine pellicle at the meeting of the Photographic Society of Great Britain: without entering upon the dangerous ground of validity of a patent, I may venture to remark that the claim of invention of a gelatine pellicle on behalf of Mr. Johnstone is a very weak one. The assertion that if his emulsion had dried—not "much virtue in an *if*" in this case—he would have had a pellicle is but a truism. *Had* he made it, his doing so would have been but an accident, and would not invalidate another man's skill or originality in making it for a definite purpose. With quite as much justice might it be said that *collodion* pellicle is not new because, in all probability, Archer in his first use of collodion had a pellicle, namely, around the lip of his pouring bottle. This neither he nor his disciples ever turned to good account, and it remained for years one of the nuisances for the avoidance of which much time and thought has been devoted in devising anti-collodion pellicle bottles, &c. So, in like manner, whoever *first* used gelatine emulsion may, by neglecting to wash out his cup after pouring, have "discovered" the following day gelatine pellicle. It does not appear, however, that anyone before Kennett saw the advantage of, and converted to practical purposes, the dried gelatine pellicle.

An operation which in theory is so simple has, I happen to know, been accomplished only by numerous carefully-conducted experiments, together with the exercise of much skill and ingenuity in overcoming a host of difficulties. Thus much in the cause of fairness and justice.—I am, yours, &c., G. S. Penny.

Cheltenham, July 24, 1876.

KEEPING OF GELATINE PLATES MADE WITH EXCESS OF SILVER.

To the Editors.

Gentlemen,—Noticing Mr. Berkeley's inquiry as to whether I had experienced trouble through plates, made with excess of silver in the emulsion, fogging by keeping, I have to report that since his letter I have developed two plates made last April by my published formula, both of which developed as bright and clean as when first made. They had been kept in a common deal plate-box in a dry, and rather warm, room.

I am not yet satisfied that the red fog complained of by several gentlemen is not ammonia stain. I do not mean a surface stain that runs in streaks over the film, but a dye that penetrates to the glass.—I am, yours, &c., Franklin.

July 22, 1876.

COLLOCINE.—ODIC PHOTOGRAPHY.

To the Editors.

Gentlemen,—In your last issue I was very much gratified by reading that Mr. F. York has at last become converted to the use of collocine, and also the hearty way in which he makes the statement; for I was fully convinced when he opposed me that what he put forward was based on actual experiment and not upon mere thought. I told Mr. York, after the meeting at which I read my last paper on the subject before the South London Photographic Society, that he would after a time succeed, for I myself, in my earlier experiments, had come to the same conclusions that he had then, but by dint of perseverance I had overcome the difficulties and arrived at the opinion I had since held.

I have also noticed Mr. Dunmore's letter; but the latter must remember that from the platform I asked him for his experience in the matter, as he had taken part in the discussion at the previous meeting, from which I was unavoidably absent. His answer was then that he had nothing to say. All I wanted was to ascertain the experience of other members.

I must also inform Mr. Dunmore that I hold no pet formula. All I desire are practical facts; and if I find I am wrong on any points I shall only be too pleased to *openly* acknowledge them for the benefit of others. But I still fail to see the purport of Mr. Dunmore's letter after stating that he had nothing to say when I asked him at the meeting.

In your last issue I also see an article by Mr. H. Collen on so-called "odic" photography, which, he thinks, may not be considered connected so much with the art as it is with the science of photography. It is very curious that I have for some time past been carrying on some experiments connected with emanations from the human hand, and have had some very curious results. These have also been observed by an amateur friend of mine. By these experiments I can account for many seeming differences in the ordinary practice of photography, and why various photographers get totally different results. I think that, if a little more were known in this direction, it would be found intimately connected with photography, and that photographers would better understand many of the so-called chemical difficulties which beset their path, and which cannot at present be explained. I hope we shall hear a little more from Mr. Collen on this subject; and at some future time I hope to be able to put the results of my investigations into a form for publication.—I am, yours, &c., W. Brooks.

9, *Stratford-green, London, E., July* 24, 1876.

COMBINATION NEGATIVES.

To the Editors.

Gentlemen,—With reference to Mr. A. E. Dighton's letter respecting my combination negative process, he is quite right in what he states in last week's Journal, as I have produced combined negatives from leather and the dark grey blankets for stippled backgrounds during my experiments in making combined negatives. Any photographer can see, as Mr. Dighton does, the value of having it in his power to make a combined negative at once from the sitter, as all stipple, or view from any transparency, goes close up to the outlines of the portrait, not needing any more attention than printing from a non-combined negative, therefore dispensing with that tiresome process of masking out.—I am, yours, &c., W. Tilley.

Stafford, July 25, 1876.

Photography in Court: Pedro *v.* Deane: Whose Property is a Negative?—This somewhat singular action was brought in the Bloomsbury County Court on Monday last, the 24th inst., before George Lake Russell, Esq., judge. The plaintiff, described as a photographic artist, sought to recover from the defendant, a private gentleman residing at Haverstock-hill, the sum of thirty shillings under the following circumstances:—The plaintiff said that the defendant called upon him early in June and asked his charge for a dozen cabinet portraits of his (the defendant's) wife, and was told that, executed in the style the defendant desired, the charge would be thirty shillings. On the following day the defendant called with his wife and she sat for her portrait, and the defendant having seen the negative approved of it. Subsequently the twelve copies were left, with the account, at the defendant's residence, and he having been applied to for the money without avail the present action was brought to recover the amount due. The plaintiff called his assistant to prove the order and his porter to prove the delivery, which evidence completed the plaintiff's case. The defendant stated that he did not deny the order being given, nor that the charge made was a reasonable one, but declined payment on the ground that the order had not been completed, inasmuch as the price charged included the purchase of the negative, from which, as he was going to India, he might get additional copies printed if required; moreover, the defendant said he strongly objected to leaving the negative in the possession of the plaintiff, as he had no wish to see his wife's portrait exhibited amongst the plaintiff's specimens, which photographers were in the habit of doing when they took an attractive picture. The defendant's wife was called, who corroborated her husband's statement. The plaintiff, being recalled, stated that the purchase of the negative was never mentioned, and that it was always customary to keep negatives unless some special arrangement was come to for its delivery to the sitter. The Judge considered that no respectable photographers would exhibit their clients' portraits without permission being obtained, and, as the present defendant had not proved the purchase of the negative, judgment would be in favour of the plaintiff for the full amount claimed, with costs of two witnesses.

A Day in the Country.—On Saturday last occurred one of those agreeable *réunions* which tend so much to cement friendship and good understanding between employers and employed. A large party, comprising the principals and the *employés* of the Autotype Company, as well from the factory as from the London offices, availed themselves of a holiday given for the purpose of having an "outing" at Henley-on-Thames, to which favourite resort they proceeded by train. After arrival at Henley, where dinner had been ordered, the party distributed themselves according to their various tastes—some taking at once to the water for bathing and some for boating; while others contented themselves with exploring some of the pretty views in the neighbourhood. At 1.30 all assembled for dinner, the members of the firm being present. Mr. J. R. Sawyer presided, Mr. J. A. Spencer taking the vice-chair. Among the company present were Mrs. and Miss Sawyer, Mr. W. S. Bird, Messrs. E. W. Foxlee, Alexander Spencer, W. T. Wilkinson, Henry Taylor, W. T. Skelton, and others whose names are more or less known in the world of photography. The dinner was well provided by the landlord of the Bull Hotel, and consisted of a very substantial and well-cooked repast, to which ample justice was done. After dinner Mr. Sawyer made a few well-timed remarks,

and requested that all present would meet at four o'clock at a spot indicated for the purpose of being photographed by Messrs. Marsh Brothers, of Henley, who had accepted an invitation to be present at the dinner. At the time appointed two negatives were taken by these gentlemen, which were quite successful. After some time spent in amusements of various kinds, the party re-assembled for tea, the presidents being now Mrs. W. T. Wilkinson and Mrs. Snelling. After full justice to the repast had been done, new parties were extemporised, and boating, walking, fishing, &c., filled up the time till the hour of departure—everyone feeling that a day of unalloyed pleasure had been spent. The party differed from the ordinary and objectionable London "bean-feast," with which is connected a system of soliciting aid from houses with which the firm whose *employés* desire to enjoy themselves do business. In the present case—with the exception of a handsome contribution from the firm, who had closed the works and offices in order to afford the opportunity to all who chose to join the party to avail themselves of it—all the funds had been subscribed by the *employés* themselves, and thus any idea of enjoying themselves by the aid of others was effectually excluded. The party returned home by the train from Henley at 8.45, well satisfied with the day's proceedings, everyone feeling impressed with the handsome manner in which they had been treated by Messrs. Marsh, who had given *carte blanche* to the visitors to stray at their leisure over the pretty garden and grounds surrounding the studio this firm have recently erected, and which reflects no slight credit upon the taste and energy of these gentlemen, whose kindness and hospitality was thoroughly appreciated.

ANSWERS TO CORRESPONDENTS.

☞ *Correspondents should never write on both sides of the paper.*

W. Kirk.—Thanks for your kind offer.

G. E. S.—We must decline publishing the name of the writer indicated.

An Obliged Reader.—Our Almanac for the current year is out of print.

Subscriber (Burnley).—Assuming that you have taken due care, the fault rests with the paper. Try another sample.

One in the Dark.—The required effect can be obtained by making use of a graduated background placed well out of focus.

C. A. S. E.—Muslin may be rendered non-actinic by giving it two or three coats of boiled oil containing orange colouring matter.

J. Y. (Manchester).—Place the alcohol and silver in a test tube, warm it over a spirit lamp, and then add the solution thus made to the collodion.

Diogenes.—You have been misinformed; there is no new copyright bill on the *tapis*. Probably you are confounding copyright with patent law.

Henry Reid.—Seeing that the varnish dries with a matt surface, notwithstanding the heating of the negative, we advise you to try another sample.

Junius (Birmingham).—1. With the stop mentioned give an exposure of one minute.—2. The aperture being in the same ratio as in the preceding case, give the same exposure.

E. M. H.—To reply to your question is quite out of our power, for there are several excellent enamellers of paper prints. Our advertising columns afford all necessary information.

Ignoramus.—The hygroscopic material required is chloride of calcium, which is altogether different from chloride of lime. It is not to be wondered at that the plates were destroyed.

A. W. Erskine.—1. As a rule it is better to protect transparencies before mounting them.—2. Use a much thicker transfer collodion.—3. We shall have an article on the subject very shortly.

W. H. Wells.—We advise you to obtain one or more of the handbooks on the subject of painting in oil colours, which are published by the leading artists' colourmen in London. They are usually sold at a shilling.

Provincial.—Place all your silver solution in a vessel of suitable dimensions, and then pour into it a solution of common salt. For the next operation we refer you to the advertisements of the refiners and dealers in "wastes."

W. W.—The No. 1 specimen is a very extraordinary one; we have never previously seen anything like it, and are inclined to attribute the effect to the gelatine substratum. The defect in the No. 2 specimen is probably owing to the collodion.

X. Y. Z.—If you are uncertain as to the legality of the intended procedure of your architect, you should address a note to Mr. Slingsby, and obtain from him a formal assent to your plans. This will at once ease your conscience and satisfy the requirements of law.

N. S. B.—The foot of the head-rest is by far too large and clumsy. If you cannot devise or procure one free from these bad qualities you had better discard the foot altogether, and place two or three sockets in the floor of your studio in which the rods of the head-rest can be inserted.

S. B. H.—1. Develope the plates with a four-grain solution of pyrogallic acid, to which two drops per drachm of a saturated solution of carbonate of ammonia has been added. No bromide will be required.—2. The washing off of the preservative must be effected *before* it has been allowed to dry.

Photolithographer.—To obtain albumenised paper in which there is no salt a special arrangement must be made with the albumeniser, who will supply any quantity of it at the same price as that charged for the usual kind. By the hot-water treatment described by us the whole of the salt is dissolved out of the albumen, which, owing to the hot water, is itself rendered insoluble.

F. B.—When using the wet collodion process a warm tone can be obtained only by employing a pyrogallic acid developer in which acetic acid is made to take the place of the citric acid in general use. The way to introduce the names is by writing or printing them upon any transparent portion of the foreground of the negative.

D. D. B.—The argento-hydrometer is of no use whatever for indicating the strength of a solution of nitrate of silver containing nitrate of soda in unknown but presumably large proportions. If the solution answer the purpose use it so long as it continues to work well; after that precipitate the silver. The volumetric method is the only one by which the real quantity of silver present in the bath can be ascertained.

The Mezzotint Vignette.—We have received several more letters on this subject, in addition to those noticed last week; but no further new features have been elicited. One of our correspondents—"A. B. C. (Stockport)"—encloses a portrait he omitted to send last week, and which is similar to those of Messrs. Brown and Barnes, although the grain of the morocco background is rather deeper printed and more "pronounced" than that of the pictures produced by the patentees.

A Scot, (Glasgow)—Our correspondent says:—"I have seen beautiful effects done here years ago (and have tried it often myself), in the way of stippling. Lay a fern or any other well-marked plant on a piece of white paper; take a little liquid blacking and a blacking brush, and draw the brush over a stretched wire, allowing the sparks to fall on the paper. The beautiful result thus obtained will much surprise you. This can easily be adapted for making a mask to produce the grain now so much desiderated.

Operator.—The cause of the flare in the lens is this:—The mount or cell in which the lens is held has a long piece projecting outside, and this, from frequently cleaning the surface of the glass with a wash leather, has become so smooth as to reflect the stray light which falls upon it, the greater portion of the light thus reflected falling upon the middle of the plate. This kind of flare differs entirely from that caused by a reflection of the light from the surface of the lens itself. The former may be designated "mechanical flare," and the latter "optical flare."

Rev. B. Black.—Yes; gelatine may be used equally as well as collodion for transferring negatives. To prepare gelatine for this purpose dissolve one ounce of it in four ounces of water, adding to this about half-a-drachm of glycerine. The negative must be made warm, and a sufficient quantity of the gelatine to cover the surface properly must be poured on the centre of the plate and spread to each side by means of a glass rod. Of course the plate must be kept in a horizontal position. After the gelatine has become quite dry it receives a coating of varnish, and a knife having been passed round the margin, so as to cut through the films, the combined layers of collodion, gelatine, and varnish, now forming a single pellicle, are lifted from the glass.

Received.—*The Panoramic Guide* for Great Western and London and North Western Railways. Messrs. Bemrose and Sons (London and Derby) are to be congratulated upon the excellent manner in which these handy travelling companions are compiled; for with these a railway journey, otherwise very apt to be dreary, may be made exceedingly pleasant. This, at anyrate, has been our experience.

☞ Editorial Communications should be addressed to "THE EDITORS"—Advertisements and Business Letters to "THE PUBLISHER"—at the Offices, 2, York Street, Covent Garden, London, W.C.

Patent Scrap Roller.—Under this designation Mr. Raphael Tuck has brought out a roller which cannot fail to be of use to photographers. Although, primarily, intended to aid in the mounting of pictures, it will also be useful for other purposes. It consists of a roller covered with india-rubber and fitted in a wooden holder so as to revolve freely. It is constructed in four different sizes.

APPLICATIONS FOR NEW PATENTS.

April 25, 1876.—"Photography, and Apparatus Used Therein."—No. 1747. H. Vanderweyde.

May 11, 1876.—"Improvements in the Production of Borders, Titles, and Other Devices on Photographic Pictures, and in Means and Apparatus Employed Therefor."—No. 1991. O. Sarony.

May 30, 1876.—"Desks for Use in Retouching Negatives."—No. 2274. F. T. Burrows and J. D. Colton.

June 5, 1876.—"A New or Improved Instrument or Tool to be Used in Mounting Photographs."—No. 2349. R. Tuck.

June 6, 1876.—"Improvements in and Applicable to Photography."—No. 2367. R. Brown and R. W. Barnes.

July 12, 1876.—"Improvements in the Leaves of Photographic Albums and in Passe-Partouts."—No. 2837. F. F. Kulbrich.

July 22, 1876.—"Improvements in Photography in Colours and in the Apparatus for that Purpose."—No. 2973. L. Ducos-Duhauron.

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THE BRITISH
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ON THE ARTISTIC IMPROVEMENT OF NEGATIVES.

Though a considerable amount of attention is given to the above subject at the present day by those engaged professionally in the production of photographic portraits, little or no trouble is taken by the generality of amateurs in the matter; and whether it be that the negatives produced by that class are beyond such improvement, or that the labour involved is beyond their capabilities, it is quite certain that little artistic work is put upon negatives except by professional portraitists. This may probably be accounted for by the fact that the majority of amateurs devote themselves almost wholly to landscape work, while the benefits derived from working upon the negative are chiefly found in connection with portraiture. This is true only in a degree. A small amount of a certain class of work produces a more favourable result in a portrait than in a landscape; but, at the same time, by resorting to different means in the latter case an equally favourable result may be obtained. In fact, it may be asserted that greater artistic results may be obtained in landscape work than in portraiture.

The methods employed may be divided into two general classes, namely, retouching by hand and working upon the negative by photographic means. The former may or may not require an amount of artistic skill according to the nature of the effect desired, while the latter necessitates a certain amount of practical knowledge as well as taste in order to judge of the probable result. The principal uses to which the various methods are put may be enumerated as follow:—The removal of accidental defects, such as spots, scratches, &c.; the correction of errors in exposure or density; the production of artificial clouds, shadows, &c.; and occasionally, in the hands of an artist, for "printing-in" accessories which do not exist in the original. This latter, however, scarcely belongs to the realm of photography, and, though very fine results may thus be secured in capable hands, it is not our intention to devote any time to its description; we shall, therefore, devote ourselves entirely to the treatment of negatives rendered defective by errors in lighting, exposure, or development.

Badly-lighted subjects will be found generally the most difficult to treat, especially those which, owing to the entire absence of sunshine, are flat and entirely deficient in contrasts. The aim in such cases must be the introduction of artificial shadows as well as high lights where it is possible; and the production of an artistic result necessarily involves the exercise of some taste and skill. If, on the other hand, the contrasts in the negative be excessive it becomes necessary to soften the heavy shadows and to supply detail where it happens to be deficient; this, however, requires to be done judiciously, and considerable practice is necessary ere success can be hoped for. If in attempting to produce detail on the shadows during development the lights have been rendered over-dense or opaque increased trouble will be entailed, as it then becomes necessary to restore the half-tones and detail which have disappeared under the continued action of the developer.

Errors in exposure and development result in various combinations of the same deficiencies, and, of course, require similar treatment, though it is impossible to lay down any rule for a particular class of negative. It is necessary to judge by a careful examination of the negative itself where it is defective, and which course it will be advisable to adopt.

The most common defect in landscape negatives consists of patches of heavy shadow, principally on the foliage, arising either from under-exposure or injudicious development. These shadows may be quite devoid of detail, or may possess it but of so weak a nature as to be useless for printing purposes. In the first case, except the operator be possessed of some artistic skill, it will be useless to attempt a good result, as the detail must be worked on upon the negative by hand. However, supposing the necessary skill to be there, the operation may be performed by means of either water-colour or lead pencil, whichever the artist may happen to be most familiar with, the latter, perhaps, being the more convenient. If detail be already present it may be judiciously strengthened by means of the pencil or colour, care being taken not to give an over-done or hard appearance to the work. If the shadows, though heavy, be only slightly wanting in density, other means may be adopted without having recourse to the pencil. They may be covered with a coloured or semi-opaque substance capable of arresting or retarding the action of the sun's rays, so that the objectionable shadows do not print so rapidly. A suitable medium for this purpose consists of ordinary negative varnish coloured with one of the transparent aniline colours, such as magenta. This may be applied with the brush, on the reverse side of the negative, to such portions as print too rapidly.

Another plan is to stretch thin paper of tolerably even texture upon the back of the negative and to work upon the paper with the pencil or with colour as may be convenient. To "stretch" the paper let it be dipped in water so as to expand to its fullest extent, and, having removed the surplus moisture, lay it down by means of a squeegee or otherwise upon the reverse side of the negative, the edges of which must have been previously tipped with gum or glue. When dry the paper will be stretched evenly upon the negative in a manner admirably adapted for working upon either with colour or pencil. The former may be employed when it is desired to soften large masses of heavy shadow, while the latter is useful for strengthening minor details; but if it be desired to sharpen an outline the work must be done upon the varnished side of the plate.

Where the density is too great in portions of the negative the paper covering such portions may be touched with weak gum-water, or Canada balsam dissolved in a mixture of ether and turpentine, or, indeed, with any solution which will upon drying leave the paper translucent and decrease its power of obstruction. If the effect thus obtainable be not sufficient the coloured varnish may be used, pouring it over the whole surface, and, when dry, removing it from the parts which are too dense. Methods have been proposed based upon the action of cyanide of potassium and other substances upon the silver deposit itself; but these are not to be recommended, as, in addition to their unmanageable character, the effect once obtained is unalterable, and the chances are greatly in favour of spoiling rather than improving the negative. The best of such plans consists in using a strong solution of chloride of copper slightly thickened by means of gum to prevent it "running." This is painted upon the surface of the dry, unvarnished film with a fine

camel's-hair pencil, and has the effect of transforming the dense silver deposit into the state of chloride, thus reducing the density of the image. As the action is very gradual almost any effect can be obtained, but it is doubtful whether it is permanent, as the action of the light upon the chloride must tend to alter its value. One advantage in this method, however, is that the chloride thus formed may be again reduced to the metallic state, if necessary, by means of a wash of alkaline pyro.

Cases often arise in which, owing to general weakness, the whole of the image requires strengthening proportionately. This may be effected by adopting one of the numerous methods of forming a secondary image by photographic means. Perhaps the best process to employ for this purpose is the one known as the "dusting-on" process, in which a solution containing glucose, dextrine, and bichromate of ammonia is poured on to the negative, dried, and, after exposure, dusted over with powdered plumbago, which adheres to the shadows and half-tones, forming a duplicate negative image. It is evident that by a judicious use of this process the density of a negative may be increased to a very great extent, without destroying the harmony, with different tints.

Another method we can recommend—and which is, we think, new—consists in coating the reverse side of the negative with bichromatised gelatine, uncoloured. After exposure and development in the usual manner it is to be treated with a weak solution of permanganate of potash until the desired effect is attained. The oxidising action of the permanganate solution gives to the gelatine film a rich colour peculiarly adapted to serve this purpose.

In conclusion: we must say that it is scarcely possible to give a more detailed description of these methods; but our readers will have little difficulty in selecting the process most suited to their requirements, and will find that a single experiment will teach them more than columns of descriptive matter.

CAMERA FRONTS.

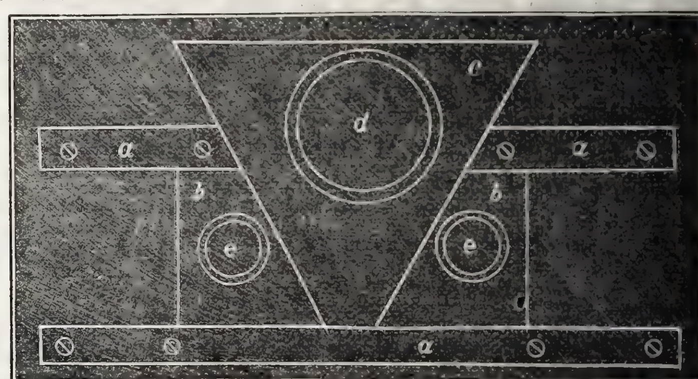
The front of our $7\frac{1}{2} \times 5$ camera contains three flanges—all in a row—for lenses. In the two outer flanges are screwed a pair of stereoscopic lenses, the centres of which are three and a-half inches apart, this allowing a pair of binocular views to be taken on the full plate, the axes of the lenses nearly corresponding with the centres of the semi-plate. To the centre flange is adapted a lens of longer focus than the others, which is intended to cover the full plate. This makes one of the most convenient forms of camera fronts that can be devised, and we are aware that the cameras of some landscape artists have been long since fitted in a similar manner. But we have recently found a certain degree of inconvenience associated with this excellent method, the nature of which, together with the remedy adopted, we shall proceed to explain.

It is well known that a great number of lenses are now made to screw into a flange the inner screw in which is one and-a half inch in diameter, and this affords room for the admission of a variety of lenses of the smaller kind. But a flange of such limited dimensions is quite inadequate to the admission of a portrait combination, or even of a cemented landscape combination, of other than small diameter; hence, for portraits, a separate front containing a larger flange must be furnished. This we have provided for the camera in question, although a considerable time back it occurred to us that by a suitable mechanical contrivance provision might be made for mounting a moderately-large portrait lens between a pair of stereoscopic objectives.

We need scarcely premise that, if a large portrait lens be mounted on the same line as a pair of stereoscopic objectives, the distance of the latter from each other must necessarily be greatly increased—so greatly, indeed, that the three and a-half inches at which they are now mounted apart, and which, for many purposes, is an inch in excess of what it should be, would have to be supplemented to such an extent as to cause binocular pictures to be distorted, owing to the exaggeration produced from the width apart of the stations of lenticular delineation.

Every difficulty has been overcome in a model which we have constructed, and in which has been happily fulfilled the desired conditions, not only of admitting of the employment of either a landscape or a portrait lens in the centre, but also of allowing the distance between the pair of stereoscopic lenses—hitherto fixed and determinate—to become adjustable, which is a most important matter in binocular photography. Although the three and a-half inches apart at which the lenses have been fixed possesses the advantage of projecting a view pretty much alike on both halves of the plate, and although, further, such a width apart of the stations or points of delineation answer for the great majority of subjects, still the fact must not be overlooked that it is an inch in excess of the average distance apart of the human eyes, and that there are frequently occasions arising when it is not expedient that stereoscopic pictures should be taken unless under circumstances identical with those under which they are seen by a spectator from a given point. This, *en passant*, is a theme which the future writer of such treatises of photography applied to jurisprudence as may be called into existence will do well to ponder; for it is well known to every scientific photographer that a photograph—even a stereoscopic photograph—may be so taken as to impart to a set of jurymen, or even to judges, a very different congeries of ideas from that which would result from a personal inspection of the place depicted.

The following diagram will convey an excellent idea of the principle of the model to which we have referred. On the front of the



camera are screwed two bars *a a*. These serve as guides for the two pieces *b b*, which carry the flanges for the pair of stereoscopic lenses *e e*; the ends of these flange-bearing pieces nearest the centre are much sloped, as shown in the diagram, and rest against the sides of the triangular piece *c*, which is made of wood, and occupies the same level in front as the pieces by which it is flanked. At its upper or wider end is affixed a flange, *d*, of a portrait or other lens of far larger dimensions than the stereoscopic pair.

It will be apparent that, as the stereoscopic lenses *e e* are at present situated, the camera is properly arranged for taking a stereoscopic picture under those peculiar circumstances which demand the lenses being at no greater distance apart than that of the human eyes. Now, by pushing downward the triangular piece *c* it is obvious that *b* and *b* which are kept pressed against the centre piece by means of springs, will be separated to such an extent as to cause them to slide out to nearly the ends of the parallel guiding-pieces *a a*, and when this is the case the centre large lens *d* will be in the centre of the camera and on a line with the stereoscopic pair of lenses. Two thin slips of brass, not shown in the diagram, prevent any light being admitted into the inside of the camera. These slips are screwed on *b b*, and cover the margins of the sides of the centre-piece.

To adapt small lenses to the centre flange, adapters of the form now in common use must be provided.

A SUGGESTION FOR PROFESSIONAL PHOTOGRAPHERS.

Rightly or wrongly, novelties of any and every sort in connection with the business of photography are considered to be of the very first interest by all shrewd men of business; and he who is first in the field with something new is generally believed to reap a fortune, though his novelty be the most trivial alteration of recognised methods. Whether such fortunes, so readily made, are creatures of the imagination only is not for us now to dwell upon; those behind the scenes could, no doubt, "a tale unfold." We merely lay before

our readers all that we see, hear, or discover which is likely to be of interest from a pecuniary or an æsthetic point of view.

If our friends will try to call to mind the class of album which, whether in the house of a private friend or a professional brother, has most pleased them, we think we shall not be far wrong in saying it is one the disposition and arrangement of whose contents are the reverse of regular and symmetrical—one with here a small picture, and there a large—one page, perhaps, dotted with tiny heads, and its companion page containing not more than one or two faces or landscapes on a larger scale—an album, in short, full of pictures in the most delightful confusion, and so arranged that even the portrait of an intimate friend, valuable only for its features, is so judiciously disposed and "hung," so to speak, that its utter worthlessness from a manipulatory point of view is hidden or lost sight of, and yet so harmonious in design that the best pictures, as works of art, have greater value given them, and their excellences shown to advantage. Such an album is not a creation of fancy. It may be seen in many a drawing-room whose fair owner is possessed of taste and blessed with leisure and desire to use it.

For years past it has been the fashion to fill albums with views acquired during ramblings up and down the country, at home and abroad, purchased as unmounted scraps, and mounted with some kind of paste in the pages of a simple album innocent of apertures of rigid, arched, or elliptical outlines. But "*carte*" portraits, in the main, are still exhibited in a ghastly array of monotonous pages filled with likenesses of living and defunct nobodies, possessing, no doubt, a vast value in the eyes of the owner, but having no interest whatever for the casual caller. The typical album we are describing, beautiful certainly as it is, and usually only to be seen, as we have just hinted, when leisure time and tasteful thought run together, has only been produced by the expenditure of considerable time and trouble—exertions which, however, always meet with admiration and praise. The cause of this is not far to find. It is simply owing to the time entailed by the preparing of the portrait pictures before they can be mounted in the smooth and unbroken pages. Every picture has to be soaked, taken off its mount, washed and cleaned in a most careful manner, too many, during this process, being irretrievably injured, and more than a few rendered unsightly by the washing off of the water-colour used for spotting.

But all this really need not be. We do not entertain, nor will our readers, any manner of doubt that the method we describe is the most elegant way of treating a collection of views and portraits, or even of one or the other. Certainly every one would not take this trouble, but a large proportion of the public would; and it is in view of this proportion, and of our professional readers' interest, that we now make public a suggestion that every portrait artist should make arrangements for supplying his clients with pictures unmounted and specially treated to enable them to carry out, if they desire, the plan of mounting upon a sheet instead of inserting within its thickness, so leading to the re-introduction in an improved form of the original "album" so common fifty years ago.

No doubt we shall be told there is nothing new in sending out unmounted *cartes*, and of this we are fully aware; for there is not a photographer in business who has not been asked for such "to post abroad." But our object is to suggest something beyond this, namely, to meet the public, and suggest to them the uses of unmounted pictures; to produce them in a convenient and handy form; and, in fact, to endeavour to make them fashionable. If this be done a benefit to the album manufacturers as well as the photographer will accrue, and once the ball is set rolling one will react on the other and the demand for each increase, and the result will be that, in a year or two, books or albums of real value in every sense will, to some considerable extent, supersede the now old-fashioned *carte* albums, which already, following the fate of stereoscopic views, are too frequently given to the children to play with.

We would not by any means be content with the simple introduction of an unmounted picture; that would possess no novelty, and would be objectionable in many ways. The photograph would have to be specially strengthened and made portable, yet not left so fragile as a piece of printed albumenised paper. A good method would be to mount them on very thin paper, leaving a white margin all round, upon which would appear the usual "imprint" or advertisement of the producer; for no professional man—and with justice—likes to send out his pictures without his name prominently visible. They might be ready gummed like postage stamps. Some scope would be here left for taste in producing such elegance or neatness that the owner would prefer to leave the name on, when pasting in his album, rather than cut it off with the scissors. If the demand arose manufacturers would, no doubt, supply sheets of very thin and tough paper, with the name printed at intervals sufficiently for a number of *cartes* for the plain prints to be mounted upon, and cut up singly afterwards. This plan would render it a matter of no trouble to print a single copy in this manner of several different sitters, while an attempt at increasing business might be made by offering a set, which might be sent out in a long slip—called, say, "a band"—at a slight reduction in price. One half the order might be completed in this style and the other half mounted.

The advantages of this new style would not be single. Postage would be saved, and many who now keep their pictures at home to save postage rather than send to mere acquaintances abroad would distribute them as freely as they do at home, which, judging by the number of a single private sitter we have often seen sent from a professional friend's studio, must be done very unstintingly. A further fillip would, we should think, be given to the sale of landscape scraps also by the adoption of this plan, as the more the fashion spread the more would the advantage be seen of variety as well as excellence in the pictures so displayed.

Our suggestion should be most welcome to the carbon workers in *carte* and cabinet sizes, as all their machinery is complete for printing in a margin containing their names, and they find it very much easier to send out a *carte* on a piece of thin paper than to mount it on a stiff board. We have but briefly indicated the channels in which this method of finishing off pictures might run, and there we leave it in our readers' hands, hoping they may think it well over, try it, and succeed.

During the recent almost tropical weather it has been a matter of no small difficulty to arrest putrefaction, even for a few hours only, in solution of albumen, gelatine, &c., which find numerous uses in connection with photography. Of the great variety of substances recommended as preservatives or antiseptics in this connection none have proved really efficient—carbolic acid, the best of them, only extending its effect to a few days in ordinary weather. A new substance has recently been proposed which is said to act much more efficiently than any previously in use, while it is free from the unpleasant odour and poisonous characteristics of most of them. We allude to salicylic acid, which, as the report says, may be used without inconvenience even for culinary purposes, producing a more complete and lasting effect than anything previously employed. This substance has already found its way into the photographer's laboratory, having long been used as an organifier for dry plates; and the suggestion arises in our mind now as to whether, in connection with gelatine plates, it may not be made to perform the double office of preservative and organifier. We employ the former term in its strictest sense as "preservative" from decomposition. While on this subject we may mention another substance which may be applied for retarding, if not altogether arresting, decomposition in gelatine emulsions, namely, tannin. Tannin, as is well known, if added to gelatine in the ordinary way, causes an insoluble precipitate; but it has recently been stated by a German chemist that, by dissolving it in glycerine previous to adding it to gelatine or albumen, the precipitate is avoided. When added in this manner we find it produces an opalescent or milky appearance in the solution; but there is not the slightest granularity, which might interfere with the fineness of the image.

DEFECTS IN PHOTOGRAPHIC PAPERS.

No. I.

In no season, so far as it has yet gone, has there been experienced more difficulty in either preparing or using photographic paper than during the present one. There are, of course, reasons for this; but

I presume it will readily be granted that one cause of it is owing to the great irregularity existing in the character and condition of the paper manufactured specially for photographic purposes, and this season happens to have been peculiarly unfortunate in this respect.

It is scarcely necessary to repeat here what, I presume, is universally known by the photographic profession—that there are but two manufactories of photographic paper for the whole world. These are respectively the manufactories of Rives and Saxe paper—the one situated at Rives in France, the other at Malmedy in Germany. Even these establishments do not confine their operations to the production of photographic paper alone, but both also carry on a large business in the manufacture of ordinary commercial paper of the usual varieties.

It might be supposed, perhaps, that it would be better were there a mill established for the purpose of manufacturing paper for photographic purposes solely, so that the entire energies and abilities of the proprietor might be directed to the perfecting of that one class of paper. This might have its advantages in one way, but not in another, for, whilst the whole ability and desire of the manufacturer ought to be directed to the one end—the production of a perfect paper—his means of selecting the best-adapted materials would be limited, inasmuch as he would not possess the variety of rags of different kinds and in sufficient quantity to enable him to select the sort most suited for the purpose. This, however, we shall pass without further comment at present.

I do not pretend to be able to judge, any more than others, whether the producers of this paper entertain proper ideas as to the great importance of supplying a paper of one constantly uniform quality, or whether they have assured themselves that they have yet attained to that standard of excellence in the quality of the article which would preclude them from attempting the production of something more perfect. Indeed, it may be remembered that the makers of the Rives paper, about two years ago, did attempt, at the suggestion of some large preparers, to produce a finer quality than the ordinary paper; but it was found that, although there might be some characteristic in the appearance of the paper which gave it the appearance of a more perfect article, the actual results in printing were nothing finer than those with the ordinary make. So much was this apparent that the vendors of the paper themselves actually mistook prints done on the old paper for what they thought was the new, and all this notwithstanding they charged fully double price for the new make. This fruitless effort would almost lead to the conclusion that they, at least, have attained the acme of perfection in so far as their (the Rives) paper is concerned; and, judging from the quality of the paper sent out during the closing portion of last year, and of this so far as it has gone, we are perfectly justified in coming to that conclusion.

If, therefore, the Rives make of paper, from whatever cause, has all along varied so greatly in quality, even up to the present day, the other make, namely Saxe (or Saxon), has not been behindhand in contributing very materially, by the irregularity and defectiveness of its quality, to the annoyance and vexation of the photographer, whether he be *au fait* at his profession or simply an amateur.

It might not be inopportune here to ask whether there really exist difficulties so insuperable in the manufacture of these papers as to require such a series of years to overcome as have been already employed. But the Editors may deem this sufficient for one communication in their useful Journal, and I shall therefore defer till next week some further remarks of a more practical character.

J. Skinner.

FERROUS SULPHATE OF SODA AS A SUPERIOR DEVELOPING SALT.

[A communication to the Photographic Society of Vienna.]

Amongst the means of reduction which may be utilised for the development of the silver picture iron has attained an exclusive preëminence; and the form in which it is employed is either as ferrous sulphate (iron vitriol) or a double salt of the same with ammoniac sulphate—ferrous sulphate of ammonium. The discussion, which lasted for a considerable time, as to the comparative worth of one or other of these salts clearly left the advantage with the ammoniac double salt, to whose claims greater weight was given by its great power of resisting oxidation, and many persons affirmed that it produced finer and better work, though that last view was not very well supported, while the cheapness of the ferrous sulphate was also an argument in its favour.

It seemed to us desirable that, in order to have a complete knowledge of the subject of development with iron salts, similar experiments should be made with the potassic and sodic salts, which, indeed, did not promise to reveal any specially-interesting facts, but then they might not be without practical and even important results. Of the three before-mentioned iron double salts, the potassic and ammoniac double salts were known long before the sodic double salt, whose preparation offered some difficulties and its properties some anomalies compared with the first-named salts, had been closely studied.

We owe a more exact knowledge of the ferrous sulphate of soda to Marignac,* who observed that an aqueous solution of the mixture of ferrous sulphate (iron vitriol) and sodic sulphate (Glauber's salt), evaporated in a vacuum at an ordinary temperature, allows the separate salts to be recrystallised each by itself unchanged, while ammoniac sulphate, under the same conditions, furnishes the corresponding double salt. Ferrous sulphate of soda, on the other hand, crystallises easily from the dissolved mixture at 35° C., or thereabouts, in distinctly separate pale green tablets. The formula is:—

$$Na_2\ SO_4.\ Fe\ SO_4.\ 4H_2\ O.$$

The accuracy of this statement is corroborated by Graeger,† who also gives the following particulars:—"The double salt is very soluble, so that one cannot bring about crystallisation by cooling a hot concentrated solution; on the other hand, it has the property of separating itself by boiling from a concentrated solution, so that one can obtain it by saturation, like carbonate of soda. This is a behaviour evidently based upon the existence of a salt containing a much greater quantity of water of crystallisation, which is very easily dissolved, since it is only necessary to heat to boiling point a concentrated solution of the double salt—which of itself, by long standing, deposits no crystals—in order to see the precipitation of the above-described double salt set in at once. When a concentrated solution has stood for a long time there forms as the result of natural evaporation a crust, hard as stone, which adheres firmly to the sides of the vessel."

According to the instructions given by E. Biltz‡ the ferrosodic double salt can be more easily prepared. Dissolve some ferrous sulphate, to which two per cent. of sulphuric acid has been added, in an equal weight of hot water, and to that add 88·8 parts of ferrous sulphate (iron vitriol) and 100 parts of crystallised sulphate of soda (Glauber's salt). Afterwards heat the liquid filtered from the resulting solution and allow it to evaporate by gentle boiling and slow stirring. The double salts will soon be thrown off as crystals, the quantity of which will increase as the boiling is prolonged. Evaporation in this manner should only be continued while a considerable quantity of fluid remains; it should then be allowed to cool, after which the remaining fluid should be poured off. (This fluid may be added to the water, and used for the solution and preparation of a new lot of salt; but, even if it be thrown away, with this cheap material the loss is inconsiderable.) Now place the salt pulp to drain in a funnel the point of which is closed by a glass ball, and remove the last trace of the acid mother-liquor by pouring a little water over it; then dry the well-drained crystal powder between sheets of blotting-paper. The resulting ferrous sulphate of soda is in the form of a fine crystalline powder of a greenish hue. It may be persistently heated to 100° C., without undergoing any change. It is *even less liable to atmospheric oxidation* than ferrous sulphate of ammonia.

We may call attention to the fact that the preparation of the sulphate of iron and sodium requires care, owing to its tendency to throw off at an ordinary temperature the ferrous sulphate and the Glauber salt separately, as if the double salt obtained by boiling down be left standing for any time with the mother-liquor the crystals of ferrous sulphate of soda will get mixed with those of ferrous sulphate and Glauber's salt, as has been observed by F. Mohr.§

The iron sodic double salt is also satisfactory both in regard to its stability and its cost, the latter being much less than that of sulphate of iron and ammonia, because the Glauber's salt employed represents a much smaller outlay of money than the ammoniac-sulphate. Ammoniac salts have risen in price, and to all appearance will rise still higher in the course of the year, owing to the ever-increasing demand for them as manures. It is the same with potassic salts; therefore the substitution of the cheap sodium (which has already in many cases taken the place of potassium and ammonium) for the latter for our purpose, the production of a cheap and durable developing salt is worthy of all consideration. In its photographic properties the sodic double salt does not differ from the ammoniac double salt; that is, it developes as well as the latter and acts in precisely the same way.

This is, perhaps, the best place for us to throw a closer light upon a widely-spread but not very clear notion, namely, the idea that

* *Jahresbericht der Chemie*, 1856, page 397.
† *Chemischen Centralen Blatt*, 1872, page 377.
‡ *Zeitschrift für Analytichen Chemie*, 13, page 124.
§ *Zeitschrift für Analytichen Chemie*, 12, page 373.

sulphate of iron and ammonia developes an image fine, clear, and rich in details, which it certainly does, because the ammoniac-sulphate contained in the ammoniac double salt combines with the argentic sulphate formed by double decomposition to form an easily-dissolved double silver salt (sulphate of oxide of silver and ammonia), while it leaves the ferrous sulphate undissolved as a granular deposit.* Naturally the already-reduced silver forming the picture would more easily and regularly attract that from the solution than the slowly-dissolving, granular, sulphate-discharging silver.

Another experimentalist tried to sustain this view by suggesting the experiment of dropping a solution of nitrate of silver in two separate solutions—one of ferrous sulphate, and the other of iron ammonia—in order to provide ocular demonstration of the greater solving power of the ammoniac double salt. On trying this experiment we were unable to observe any difference in the behaviour of the two solutions. A surer way of getting a true decision was to ascertain exactly the solubility of sulphate of oxide of silver in water and aqueous solutions of sulphate of sodium, potassium, and ammonium, in order to estimate at the same time the proportions in this direction of the other double salts in developing.

Proportionate Solubility of Sulphate of Silver.—We studied closely the proportionate solubility of the difficult-of-solution argentic sulphate formed in the collodion film saturated with the argentic nitrate of the silver bath in combination with the sulphate of the developer, when the latter (the sulphate of iron developer) is poured upon the silvered and exposed plate for the purpose of bringing out the picture, because it is certainly not without influence upon the course of the developing process.

The questions—"Does ammoniac sulphate increase the solubility of argentic sulphate?" and—"Do sodic sulphate and potassic sulphate act in the same way, or do all three behave indifferently?" also presented themselves to us. Failing to find any elucidation in the technical journals we made the following exact observations and formed by analysis the basis of the four following statements:—

1. At 18° C. a saturated aqueous solution of pure sulphate of oxide of silver contained 0·58 per cent. of sulphate of oxide of silver.

2. At 18° C. a saturated solution of sulphate of argentic oxide, to which fifteen per cent. of ammoniac sulphate had been previously added, contained 0·85 per cent. of dissolved argentic sulphate; on dissolving five per cent. of sulphate of ammonia in the water before saturation with argentic sulphate, the saturated solution contained 0·66 per cent. of the silver salt.

3. At 18° C. a solution saturated with argentic sulphate, to which thirty-seven per cent. of crystallised sodic sulphate (equivalent to fifteen per cent. of the ammoniac salts) had previously been added, held in solution 0·80 per cent. argentic sulphate. A twelve-per-cent. solution of Glauber's salt was able to dissolve 0·65 per cent. of sulphate of silver.

4. An eighteen-per-cent. solution of crystallised potassic sulphate was able to absorb 0·76 per cent. of argentic sulphate, and a six-per-cent. potassic sulphate solution to absorb 0·60 per cent. of sulphate of silver.

The consideration of these figures shows that the ammoniac sulphate contained in the developer (when using an ammoniac iron developer), which at most only amounts to some three per cent., can have little or no perceptible influence upon the formation of the picture by the solution of argentic sulphate. The ammoniac, potassic, and sodic sulphates do, indeed, increase the solubility of the argentic sulphate; but, at the same time, the trifling difference in the effect produced upon each by the presence of foreign salts is visibly diminished. The presence of ammoniac sulphate is thus unimportant as a solvent, and, on the other hand, the action of sodic sulphate and of ammoniac sulphate are so similar that even he who places the highest value upon the iron ammonia developer for its very slight increase of the solubility of the argentic sulphate is exhorted to replace the capabilities of the ammoniac double salt by the iron sodium developer.

Truly the nature of photographic processes is very subtle, often no quantity of a substance having any influence. In this case we must, depending upon the experience we have gathered by the comparison of experiments in developing, exclude from our view that in the action of ferrous sulphate which ranks the double salts together, and give the preference to the double salt whose power of resisting oxidation is the greatest. After the foregoing there can be no doubt as to which of the double salts we shall cling. Our choice will be the most oxygen-resisting and, at the same time, the cheapest—ferrous sulphate of soda.

DR. JOSEF MARIA EDER.
VICTOR TÓTH, *Captain.*

* When iron ammonia is used in the developer five parts of iron vitriol or seven parts of iron ammonia is replaceable in the formula by seven parts of iron sodium, the iron sodium containing in the same quantity but little more iron than the ammoniac double salt.

NOTES ON PASSING EVENTS.

By a Peripatetic Photographer.

If Mr. Richard Brown's sole object in patenting the "mezzotint vignette" was to ensure its receiving due attention from his fellow-photographers, that object, I imagine, has been secured, and he will now be in a position to inform the public that they are free to produce mezzotint vignettes without any hindrance from him or from his patent. Of course, no one who knows Mr. Brown would for a moment imagine that he took out his patent for mere pecuniary aggrandisement. Indeed, far different were the sentiments enunciated and the spirit displayed by that gentleman, in his article in your Almanac for 1874, entitled *How I Nearly Became a Great Inventor*, in which he administers a smart castigation to those who, "hitherto but little known to fame, but withal

"'Observers of those poor trifles
Which the noble mind
Neglects and scorns,'

had suddenly rushed into notoriety by the introduction of some apparent novelty in the practice of our art, and protecting their discovery by 'royal letters patent,' had thus become the 'observed of all observers,' unlike much greater men who had introduced something really valuable and important, and having given it to their fellow-workers 'free, gratis, and for nothing,' are soon forgotten, and find themselves rewarded for their labour by their pains." The sentiments here enunciated and the spirit displayed would, I say, indubitably preclude the possibility of Mr. Brown adopting in 1876 the *rôle* he so severely satirised two and a-half years ago. If the patent be intended as a practical joke, as I imagine it must have been, it has been a capital one. On the merits either of the mezzotint vignettes themselves or on the validity of the patent I do not chose to descant, as these have received ample discussion at the hands of the public already, and may probably receive still more.

Those American photographers who would like to practise carbon printing, but who cannot do so on account of the heat, are certainly deserving of our sincere commiseration. Mr. A. L. Henderson says that the temperature was 101° in the shade when he visited Philadelphia last month, and at such a degree of temperature there would, indeed, be great difficulty experienced in keeping the gelatine of the carbon tissue from liquefying.. But I imagine that there would be very little expense, and no difficulty at all, in reducing the temperature of one room to such a degree that a gelatine film would dry very rapidly after being wet without the possibility of its becoming dissolved. I believe that with water and baths at a temperature of from 60° to 65° Fah., and with an atmosphere of 70°, every photographic operation necessitating the employment of gelatine can be conducted in the most perfect manner conceivable. The cooling of any quantity of water down to 60° is an operation that is indeed easy in any place in which ice is accessible; and as in summer ice is to a large extent regarded as a necessary it can be easily procured at a cheap rate in most large towns. The most obvious way to cool water is to place in it a small lump of ice; but this is very far indeed from being the best or most economical method, which is to crush the ice, mix it with a quantity of common salt, and put this mixture into a deep tray of wood in which is placed another of metal containing the water. So intense is the diminution of temperature thus produced that when the proportions of the ingredients are two parts of ice to one part of salt the degree of cold produced is 5° below zero, no matter what may be the temperature of the atmosphere at the time. If this mixture be made in the operating room—which ought to be as small as possible—it is easy to perceive how the air will be cooled down to winter temperature. I have heard some persons complaining of the difficulty of preparing and developing gelatino-bromide plates during very hot weather. What I have said above will prove a useful hint to such. I wonder if any gelatino-bromide workers have observed that the operations of gelatino-bromide are affected by the richness or poverty of the atmosphere in ozone? If they have it would be interesting, to me at anyrate, if their experience were recorded. Before leaving the subject of temperature and frigorific mixtures permit me to recommend an amalgam of sixteen parts of crushed ice and ten parts of strong hydrochloric acid. This will produce 59° of cold, for the thermometer which, when immersed in the ice, will stand at 32°, quickly sinks to 27° *below* zero, or, in all, to 59° of cold.

Of all the funny blunders that has occurred in the Journal of late that of Mr. Williamson, a member of the Edinburgh Photographic Society, is the funniest. He gives a whole string of literal and verbal quotations from one of your editorials, the point of the joke consisting in the fact that not a single word of his literal quotations

is therein to be found. I have heard of "second sight" in connection with certain residents of the north; is this a case in point? and has Mr. Williamson recorded what he imagined he saw passing through the minds of our Editors? We all know it is said that it requires a surgical operation to get a joke—especially a bad joke—into the head of a Scotchman? Have the crania of any of our northern friends been subjected to any operation in connection with Mr. Williamson's rare joke?

(To be concluded in our next.)

ON THE INTENSIFICATION OF NEGATIVES OF ENGRAVINGS.

When intensifying negatives of engravings with bichloride of mercury, its action must be carefully watched lest it destroy the delicate lines and obliterates them by an excess of precipitate. The image gradually becomes white, and, when no further action is apparent, wash well without delay. Proceed, finally, to produce an opaque brown tint almost impermeable to light. Pour into a glass a sufficient quantity of—

Water	100 c. c.,
Hyposulphite of soda	3 grammes,
Concentrated ammonia	6 drops,

and with this flood the plate. The action is immediate; the white negative immediately turning to an intensely dark colour, no further intensification is required. Adhere to the proportions of the intensifier given above. Wash with plenty of water and the negative is completed.

The composition of this intensifying solution is new, and it has been suggested by the results which produce the sulphide of ammonium. In fact, the formula has been compiled on such principles as will ensure, with the mercury of the image, the production of a black opaque precipitate.

One great advantage in this method of intensifying is that the disagreeable odours of sulphide of ammonium are avoided. The less ammonia that escapes during the operation the better. If sulphide of ammonia be used, instead of the preceding, it should be diluted with water in the proportion of about one part of the sulphide to four of water. After applying it wash the negative well with water and weak gum before varnishing; for by doing so the vigour of the negative is better maintained.

Finally: a third means, which has given the best results, consists of replacing the reacting agents by an iodide solution:—

Water	100 c.c.
Iodide of potassium	3 grammes.

After using it the image appears by reflection of a dull green colour, but like black velvet when looked through. Iodide of cadmium, although it is more expensive, gives still better results with regard to intensity and stability. It is always after the application of the bichloride that these different reagents are used. The use of iodide gives the further advantage of perfectly clearing the lights in the negative and removing all traces of fog.

—*Bulletin Belge.* C^TE. Ludovico de Courten.

PHOTOGRAPHIC *ATELIERS* AT HOME AND ABROAD.

Under the heading of *A Photographic Palace*, the *Toledo, O., Blade* has given a detailed account of a studio erected by Messrs. North and Oswald, which we transcribe:—

None but those who have visited within the last few days the superb *ateliers* recently opened in the Hall Block, by Messrs. North and Oswald, have any conception of the elegance and completeness of the apartments which that firm has prepared for the accommodation of its customers and its own facilities for doing work.

Let us give a brief description of the place, as a sort of guide-book for them when they do go. The visitor ascends upon the fine passenger elevator at the St. Clair entrance to the fourth floor, and thence proceeds along the hall to where a display of pictures and a glass door bear the name of the firm and an invitation to enter. Availing himself of this invitation the visitor finds himself in an elegantly-furnished, light apartment carpeted with gray lilac Brussels, and hung with pictures, the windows draped with lace curtains, and the walls decorated with pictures and large pier-glasses. A handsome fountain plays in an aquarium in the centre of the room, flowering plants are scattered around, and a splendid Steinway grand piano, made at the Steinway factory expressly for Messrs. North and Oswald, offers facilities for those of the visitors who are musically inclined. One side of the room is cut off by a tasteful counter, decorated in green and gold, and bearing the firm's monogram. The young lady cashier presides at this. Behind the counter is a handsome show-case for frames. A delivery-case is also an attractive article. Adjoining this room is a small apartment for the ladies' toilet, furnished with an elegant dressing-case the mirror of which extends nearly to the floor, and other appliances for the convenience of lady patrons. Near this is a toilet room for gentlemen.

A door leads from the reception-room to another well-appointed room, which is Mr. Oswald's studio, in which he does all his fine crayon work, india-ink and water-colour finishing. It is tastefully carpeted, and furnished in keeping with the reception-room.

Adjoining this is the finishing-room—a spacious apartment where pictures are mounted and framed, negatives retouched, &c. Next to this is a fine light room—the printing-room—where all the printing is done from negatives, &c. This is provided with all the facilities for the prompt and successful execution of the work. One feature worthy of note is the arrangement for the care of negatives. As soon as each one is used it is enclosed in an envelope to protect it, is numbered, labelled, and put away, so that if at any time another set of photographs are wanted from it they can be printed with the least possible trouble.

Connected with this is the silvering-room—a dark room for preparing the paper for printing. It is furnished with a gas stove and steam coil for drying the silvered paper. The skylight or glass room, which is the principal feature of the establishment, is reached by an easy stairway from the reception-room, or office, to the operating-room. There one finds himself in what the concurrent testimony of all who have seen it have pronounced to be the *finest operating-room in the States.* It stands up clear above the roof of the main building, and receives the light perfectly free from reflection or refraction from every direction. Part of it is formed altogether of large sheets of glass, set in sash, and extending from the floor on each side to the centre of the roof. The room is fifty-six feet long by thirty-six feet wide, and is several feet larger than any other known gallery. The manner of arranging the light is Mr. North's own invention, and the results attained by it promise to surpass anything heretofore known in photography.

The side lights on the north-east side are clear glass, for use in cloudy weather, but those on the south-west side are ground, for use on sunny days, to give a quick-working light. The light is regulated by twenty curtains—ten of dark brown goods and ten of white muslin. These slide on wire, and are easily adjusted to give any required shade of light to suit any shade of display or any complexion.

Another special feature is a mammoth background—$30 \times 11\frac{1}{2}$ feet—for family groups. This is said to be the largest background in the country, and it admits of the taking of very large groups.

Adjoining this is the chemical room, for the preparation of the plates. This is fitted up with every improvement conceivable for increasing the facility and excellence of workmanship. Next to this is the room for the solar camera, in which the copying and enlarging is done.

The planning and arrangement of the photographic or working part of this establishment has been the work of Mr. North, who has here carried into execution ideas of improvements which he has been maturing during the many years he has been engaged in the business. As a photographic artist he has few equals in the country, and now, as he has surrounded himself with appliances of an unusually high degree of perfection, he expects to turn out even better work than ever. Mr. Oswald's speciality is crayon portraiture, and working up fine photographs artistically in india-ink and water colours—an art in which he is a master of high reputation.

Messrs. North and Oswald have displayed great taste in the arrangements of their rooms, furniture, carpets, and decorations throughout. They have gone quietly to work to give their patrons and visitors as fine a reception as possible; they have an extensive business won by hard work, and this is the result of close application and trying to please all. For eleven years they have been gradually improving, and now stand at the head of their profession in this section of the country.

We now turn from the United States of America to Edinburgh, and give an account (furnished by Dr. John Nicol) of two studios in that city:—

The changes consequent on our "flitting" term mentioned in a former batch of *Notes* are now complete. The changes effected by Mr. Moffat and Messrs. Ross and Pringle are probably the most important. Mr. Moffat has given up his establishment in the centre of Princes-street, and is concentrating all his energy on what was hitherto his west-end branch. He is one of the fortunate few who

took to photography as a profession at an early period of its history, and has all along, in a quiet way, done much good and profitable work, and his present premises are excellently situated and admirably adapted for his large and high-class business. The reception-room, which is on the first floor, is an elegant apartment, from the windows of which a magnificent view of Princes-street gardens and the Castle is obtained. In various parts of the room are placed several stands, cases, and tables, which, as well as almost every portion of the walls, are covered with fine specimens of the various styles of work done in the establishment, from the smallest ivory miniature to full life-sized paintings in oil, the whole forming an exhibition of a most attractive character.

I do not know that Mr. Moffat will thank me for it, but I cannot help saying to those of my readers who may visit Edinburgh that, if they want to see a collection embracing specimens of the greatest excellence in almost every department of photographic art, they should make a point of visiting his reception-room. The principal studio is reached by a flight of a few steps. It stands north and south, is on the ridge-roof principle, with the ridge considerably out of the centre, and the sitter receives his main illumination from a high side light. To prevent the operator being disturbed access to the laboratory, enlarging-room, &c., is gained by a gallery along the outside of the studio. Another flight of steps leads to a second studio, smaller in size, and placed immediately over the north half of the one below. On a level with this the large printing-room, in which the work is done by light from a cupola, the finishing and retouching rooms, and rooms in which the negatives are stored, are situated; and still higher up there are various apartments used for residuary purposes. But, extensive as the premises are, Mr. Moffat is not quite satisfied with the accommodation, as he is about to erect on the flat roof of the back buildings a copying department, for the more convenient carrying on of this already large and constantly-increasing branch of his business. Altogether the establishment is very complete, and Mr. Moffat, who is an excellent business man, seems to find it more to his purpose to make others work than to do so himself; that is, he has the knack of getting first-rate heads for each department, and finds employment enough for himself in being "the man at the wheel."

Messrs. Ross and Pringle have returned to Princes-street, where the original firm, Ross and Thompson, had its commencement. When the premises there were found too limited and inconvenient for their gradually-increasing business they removed to Brae House, where they had ample scope for both outdoor and studio work, but by-and-by the Caledonian Railway coveted the place as a site for a station, and gave them fourteen hundred pounds to remove. From thence they went to George-street, and now, after being ten years there, they have taken the premises vacated by Mr. Moffat. Much of what may be called the "natural" architecture of Princes-street is very similar in its general arrangements, and therefore, to a certain extent, the description of Mr. Moffat's establishment is equally applicable to that of Messrs. Ross and Pringle.

The saloon, or reception room, commands one of the finest views in the city, including the Castle, Princes-street Gardens, and Princes-street itself, both east and west, with its ever-changing, busy throng. The room is severely plain, but chastely elegant. Of furniture there is literally none, except a few chairs and a kind of ottoman in front of the window; but the walls are completely covered with specimens of all the various kinds of work for which the firm has long enjoyed a reputation. Conspicuous amongst these are, naturally, the paintings in oil on a photographic basis, some being by Mr. Ross himself, and others by the various artists they employ, whose names in most cases are painted on the pictures—a thing which I do not remember having seen in any other establishment. Mr. Ross is an enthusiast in his profession, and nothing seems to give him more pleasure than to point out to an appreciating eye and a willing ear the various beauties of the collection, which includes nearly all the Scottish peerage, and not a few of that across the border.

The principal studio is only some six or eight steps above the level of the saloon. It measures 24 × 15 feet, and runs north and south. The roof is pyramidal in form, and screened with large louvre boards. The east and west sides are glazed with obscured glass, except a portion in the centre of the east, which is the principal light, and which is clear from the top to about one-third down. At first there was some difficulty as to how the boat with real water, which has long been so popular with the *clintèle* of the firm, was to be managed, but that has been got over very satisfactorily. The boat has been set in a framework of wood and canvas, and with highly-glossy paint a representation of waves and froth has been made so real as almost to defy detection. On the same level the dark room, which is well lighted and well ventilated, is situated. It contains ample accommodation for two or three operators, and is furnished with slate developing-troughs, which have been in use for ten years, and are as good as when first put together. An easily-ascended flight of stairs leads to a smaller studio placed over the dark end of the one already described, and which stands east and west. In this I saw excellent negatives being made with very short exposures—shorter, in fact, than they used to give in the studio in George-street, where the quantity of available glass was much larger in proportion than here. On the floor on this level there is a large room which has been divided into compartments for retouching, preparing paper, print-washing, and finishing generally, and anyone who may have the *entrée* to this will have an opportunity of seeing how quietly, yet rapidly and satisfactorily, the high-class work of a busy firm is done. Above this, and erected literally on the slates, is a building of wood and glass, one half of which is devoted to printing and the other to enlarging. This latter may be regarded as a camera, literally a *chambre noir*, in which the plate is not only prepared and developed, but exposed also.

As an indication of how science is gradually creeping in everywhere I may say the whole establishment is fitted with a system of electric bells in such a way that instant communication may be made from any one place to another, and that by a simply-understood code of signals telegraphic messages can be made to save much valuable time and much waste of muscular energy in running up and down stairs.

FOREIGN NOTES AND NEWS.

The Medal Reform.—German Industrial Art at the Centennial Exhibition.—Silica as a Glass Cleaner.—Herr Leipold's Appointment.—Simultaneous Printing of Lichtdruck and Text.

The great medal and exhibition question which lately agitated the Edinburgh Photographic Society has turned up at Vienna in a different and milder form on the occasion of the Society there being officially asked if its members would exhibit at the projected International Exhibition at Paris in 1878. It seems pretty generally conceded that some modification of the present system of rewards is required to adapt it to the needs of today, but it by no means follows as of necessity, some of our professional brethren seem to think, that the proposed reformation should take the shape of "reforming them off the face of the earth," probably on the principle that "comparisons are odious"—an adage which, when rigidly applied, does certainly exclude the idea of any reward being due to merit, unless, like virtue, it be its own reward. Dr. Hornig, as the mouthpiece of the Vienna Photographic Society, advocates a middle course. He thinks the reform might take the shape of prizes offered for competition at the larger exhibitions for special subjects to be specified beforehand, and for discoveries in specific directions calculated to further the true interests of photography; in short, a combination of the reward for the most perfect examples of pictorial photographs produced, with the reward—not endowment—of research. This proposal, however, opens up another question as to the powers of exhibition commissioners to specify subjects for competition.

Dr. Hornig has also something to say as to the bad effects of exhibitions following each other with too great rapidity; but what would free-traders think of his plan for rousing Austrian photographers from the apathy bred of familiarity with which they regard exhibitions?

Apropos of exhibitions, the unfavourable verdict passed by the New York *Sun* and Dr. Vogel on the German industrial department of the Centennial Exhibition at Philadelphia is not so crushing as that given by the German Chief Commissioner, Professor Reuleux; so we may assume that the superiority of everything German over everything British which has been dinned into our ears for the last few years will not be so much vaunted for some time to come—at least, in so far as regards industrial art. The main object of German manufacturers, the Chief Commissioner says, is to produce an article that shall be cheap and nasty, and in this they find it easy to succeed, as the workmen they employ are deficient in taste and skill, and his compliment to their hero-worship as exemplified by the number of statues of Bismarck, the Red Prince, and other heroes of the war, "in every conceivable material, from gilt bronze down to common soap," is that "the German nation seems to be steeped in utter servility." The curious feature of the case is that, though, according to the Berlin correspondent of the *Times*, this censorious criticism has given rise to much animated discussion, its substantial truth is "frankly admitted on every side." In photographic matters we are glad to believe that things are not in so bad a state.

The *Photographische Correspondenz* says that the new substance, introduced by the Gebrüder Grüne and Hagemann, for polishing glass plates and cleaning glass baths and other glass vessels, is brittle silica. In recommending it Herr Grüne says that the physical and chemical properties of this substance render it peculiarly suitable for the purpose, and that for a long time he has used it with success for cleaning even the dirtiest plates and vessels, while its extremely low price render the cost of even a great quantity scarcely worth mentioning. The infusorial earth, which is found in the Lüneburger Heath, consists of microscopically-small scales and parts of scales of infusible pure silica in the form of a light, porous, unburnable, infusible, mealy mass, which, at an ordinary temperature, is unaffected by the most various chemicals. It may be obtained commercially in great quantities, and, moistened with water, cleans glass plates so easily that even greasy ones can be brought into a usable condition without any extraordinary amount of washing. This effect depends in part upon the extremely fine division of the particles, and in part upon the unusally great power of absorption possessed by the silica, which takes up twice its weight of fluids without melting—a property which is found extremely convenient when it is used to solidify to a certain extent, to prevent the spirting or running over of, and thus to economise, acids, alkalies, or other strong solutions always in a fluid state, when employed for cleaning. For this purpose the silica has only to be saturated with the fluid in question—such, for instance, as nitric acid, ammonia, alcohol—and as the silica completely resists the action of these chemicals it exercises no influence upon any bath in which it may be placed. To clean glass baths, vessels, and bottles rubbing them or shaking them up simply with moist silica is enough; but when the impurities to be removed are greasy or resinous the silica should be moistened with alcohol, benzine, or ether. From its great bulk and its low price silica is valuable as an absorbent for the droppings, overflows, or spirtings of fluids, or to prevent them from spreading when spilt from a broken or overturned vessel. Its absorbing power is said to far surpass that of blotting-paper.

Herr Josef Leipold, whose experiments in heliogravure are widely known, has been appointed acting director of the printing establishment of the Bank of Portugal.

Herren Brauneck and Maier propose to start a periodical illustrated by photographs, the pictures and letterpress of which shall be printed simultaneously. For this purpose they propose to have a Schnell press constructed capable of printing four, six, or eight different pictures, with the accompanying text, at once. To prove that this plan is quite feasible they have issued a circular containing a specimen picture, the title of which was printed by the same operation as the picture; and, lest the truth of their statement should be doubted, their circular is accompanied by a declaration signed by Herr Adolf Ott, chemist, a Swiss commissioner and juryman at the International Exhibition at Philadelphia and ex-juryman at Vienna, in which he affirms that at the photographic establishment of the aforesaid firm he saw, "with his own eyes," a number of proofs of pictures pulled by a Schnell press in which letterpress and photographs were printed by a single operation.

EDINBURGH PHOTOGRAPHERS' ANNUAL HOLIDAY.

The annual holiday and excursion, which has now become an institution in Edinburgh, came off on Thursday, the 27th ult., with, if possible, more than the usual *éclat*. The arrangements, as on former occasions, were undertaken by the "out-door committee" of the Edinburgh Photographic Society, the members of which deserve much credit for the zeal, energy, and good management which led to such a decided success.

The public, as well as the members of the profession, were well prepared for the holiday, both by advertisement and the exhibition of notices in the studios intimating the intention to close, the result being that business was altogether suspended in all the principal establishments of the city and suburbs, enabling both employers and *employés* to join the excursion. Notwithstanding the fact that the principals and staff of one of the largest firms in the city went off at an early hour on an excursion of their own, and the members of several others made private arrangements for the day, a party little short of the usual number assembled at the Waverley Station, at 9.15. and proceeded by special train to Winton Castle, the seat of the Hon. Lady Ruthven, and one of the most beautiful and suitable places for picnicing in the country. Mr. Lessels, to whom they were indebted for the facilities given by Lady Ruthven, and who had gone to Winton the previous evening, met the party on their arrival in the grounds, and in the name of her ladyship gave them a hearty welcome and permission to ramble whereever inclination might lead.

The business of the day began with luncheon, in which Mr. Muir's annual gift of beer was an important element; then three groups were taken by Mr. Annan on 16 × 12 plates, and one of a smaller size by Mr. Turnbull; after which amusement became the order of the day, and, with the younger members of the party at least, dancing on the bowling-green the principal amusement. Those fond of more active exercise adjourned to the meadow below the castle and had a turn at football; and "Aunt Sally" and several other games came in for a fair share of patronage.

At one o'clock the gong sounded for dinner, which was admirably provided by Mr. Pillans, and heartily enjoyed by the whole party. When the more solid part of the entertainment had been discussed,

The PRESIDENT of the Edinburgh Photographic Society, who was in the chair, said that although he did not intend to make a speech, as there was neither toast nor sentiment on the programme, he could not permit the oportunity to pass without congratulating all concerned on the very favourable state of the weather, on which the success of the trip so largely depended. To Lady Ruthven they were deeply indebted for the unrestricted permission to roam at will through the magnificent grounds, also for her ladyship's kind invitation to inspect the many curious and beautiful articles in the castle; but more especially for the honour which she had conferred on them by her presence in the delightful ball-room so generously placed at their disposal. Thanks were also due to the committee who had made such excellent arrangements; but he would say nothing more on that head, as he knew that they had their reward in the great success which attended those arrangements. Last, but not least, he (the President) said that most hearty thanks were due to the purveyor, Mr. Pillans. It was no easy matter to cater successfully for a large party at a distance from home, and many a man, with the best intentions, failed from want of experience. Mr. Pillans had shown himself to be thoroughly up to his work, and he believed that he only stated the simple truth when he said that their commissariat had never before been so well managed.

After dinner the dancing and games were resumed, with which were alternated some excellent vocal music. There was, of course, the usual breaking up into twos and threes for the enjoyment of quiet strolls through the grounds or quieter seats in cosey corners, while numbers visited the rural village of Pencaitland and its quaintly-beautiful old church.

Five o'clock, the appointed tea-time, seemed—to some at least—to come too soon; but the tea was nevertheless much enjoyed. Before leaving the table,

Mr. W. H. DAVIES asked the company to drink the Chairman's health, remarking that, as speeches were forbidden, he would only say that if the purveying had never been better, they had never sat under a better chairman, or one who had done more to promote the harmony and success of the annual holiday.

After another hour spent on the bowling-green the proceedings were brought to a close by the time-honoured singing of "Auld Lang Syne." The party was then formed into fours, and marched past Lady Ruthven, who had again come out, and they gave her three ringing cheers by way of goodbye. The station was reached at 7.15, and in a few minutes the train, which had been in waiting, started on the homeward journey, reaching Edinburgh at eight o'clock. The excursion passed off without a single hitch, and was in the highest degree a decided success.

PHOTOGRAPHING PRISONERS.

THE *Daily Telegraph* of Saturday last, alluding to a recent alteration made in the Prevention of Crimes Act, says:—"Most people, no doubt, remember the picture of the *Bashful Model*, which appeared some time since in the *Graphic*. The bashful gentleman in question was a convicted criminal who had just arrived at one of her Majesty's gaols, fresh from the sessions or the assizes, to serve the term of imprisonment to which he had been sentenced. Prior to taking his bath, having his hair cut, and being clad in the prison garb it became necessary, in conformity with the Act of 1871 directing that 'all persons convicted of crime in the United Kingdom should be registered and photographed,' to make him sit for his portrait. Presumably he was what in French criminal slang is termed '*un cheval de retour*'—a veteran gaol-bird; and he was cunning enough to be aware that the preservation of his *carte de visite* in the prison album might be productive of effective service to the authorities in identifying him should he at any future time come under the ban of the law. Thus, naturally enough, the man was decidedly reluctant to be focussed. He was not to be cajoled; he was not to be awed by threats; he violently resisted all efforts to bring him within the range of the lens; he kicked, he plunged, and eventually he had to be held down in his chair by a posse of stout warders, aided by the driver and guard of the 'Black Maria' which had conveyed him to his new abode. Perhaps the framers of the alteration which has lately been made in the Prevention of Crimes Act would have done wisely in pondering a little over that cartoon in the *Graphic* ere they partially abrogated a regulation which, while it excited the greatest terror among habitual criminals, was of corresponding advantage to the honest part of the community, in enabling the police to track, and prison-warders to identify, individuals who had already been 'in trouble.'

It would seem, however, to have been the opinion of authority that 'unnecessary expense' was incurred by photographing every prisoner who passed the gaol-wicket; and a supplementary act of parliament just printed directs that the Government only is to prescribe the class or classes of prisoners to whom photographing and registration shall apply. To talk of 'unnecessary expense' in connection with registration is obviously absurd. The clerks' office of every gaol contains surely a sufficient amount of pen-power to render the entry in a book of all necessary particulars relative to a prisoner a matter of the smallest cost and trouble, nor need the process of photography be made a heavy burden on the county rates. A local artist would generally be found ready to contract for 'doing' all the inmates of a gaol for a pound a week; and chemicals, negative plates, and sensitive paper would not on the average cost more than another sovereign. If, on the other hand, the operator were a prison-warder who received an addition to his salary for exercising his skill in photography it would not add to the expense of the *main d'œuvre* if he took one or twenty portraits a day. The only valid excuse for relaxing the stringency of a most useful system might be found in the fact that the vast majority of prisoners, vagrants, tramps, beggars, brawling roughs, and petty thieves are astonishingly gregarious, and that, as a rule, it is a sheer waste of time to take separate portraits of scamps who are as like to one another as two sheep or two peas."

We also give some remarks on the same subject which appeared in the *Daily News* of Monday last:—"An alteration has recently been made in the criminal regulations which prescribed that all persons convicted of crime in the United Kingdom should be photographed under the auspices of the prison authorities. Of late years it has been customary to take the portraits of all criminals habited in their ordinary dress and before they have assumed prison garb, copies of these photographs being then distributed to various head-quarters about the country, where they were registered for subsequent reference. There cannot be a doubt that such a course acted as a preventive of crime, inasmuch as it enabled the police authorities to supervise more effectually the habitual criminal, and gave the latter a salutary check in the knowledge that his portrait was carefully preserved in the prison collection. We are now informed that to get rid of 'unnecessary expense' the practice of photographing criminals will in future be dispensed with, except in the case of those classes of prisoners particularly specified by Government. In France, or rather we should say Paris, the camera is, on the other hand, being employed more and more to further the ends of justice, and upon the Paris police staff there are at the present moment two professional photographers serving with the rank of inspector. The services of these gentlemen are frequently sought to detect crime. In this country the photographic operations undertaken in prisons are either performed by one of the warders skilled in the art or by a professional photographer in the neighbourhood of the prison; but in either case the expense involved cannot have been very great, while as to its being unnecessary there will be much difference of opinion. We trust, however, that in all cases where habitual criminals are concerned the photographing and registration will be continued in force. We can well understand that the Criminal Portrait Gallery is gradually becoming very extensive, and that it has become necessary to place some limits upon its dimensions. At the same time it must be remembered that such photographs can only serve their purpose for a certain period, and that after a term of years a large number of them might be put away or destroyed, either on account of the criminal forsaking his evil ways or by reason of the photographs themselves becoming valueless by lapse of time. We should be sorry to see so valuable a deterrent of crime as the camera sink into disuse in our prisons."

Meetings of Societies.

AMATEUR PHOTOGRAPHIC ASSOCIATION.

The adjourned meeting of this Association was held on Tuesday, the 25th ult.,—the Right Hon. the Lord de Ros in the chair.

Mr. Glaisher, in laying before the Council his annual report, said that it was gratifying to find that the pictures for the present year were of a much higher average than last year, and called especial attention to a series of Indian pictures, which were equal to anything ever contributed to the Society. The following is an abstract of Mr. Glaisher's report:—

Class I. contains 108 pictures, contributed as follows:—Dr. T. Cooke, M.A., 33; F. Beasley, Esq., 17; R. O. Milne, Esq., 8; W. S. Hobson, Esq., 6; F. G. Lloyd, Esq., 6; J. McAndrew, Esq., 5; W. Armstrong, Esq., 5; F. S. Schwabe, Esq., 4; T. Brownrigg, Esq., 4; R. Meade, Esq., 4; J. C. Stenning, Esq., 3; W. Vanner, Esq., 3; R. Murray, Esq., 3; J. H. Ritchie, Esq., 2; A. L. Steavenson, Esq., 2; Lord de Ros, 1; J. W. Richardson, Esq., 1; Rev. H. Palmer, M.A., 1; K. D. P. Roberts, Esq., 1; Capt. D. MacNeill, 1.

Class II contains 103 pictures, as follows:—F. Beasley, Esq., 19; Dr. T. Cooke, M.A., 11; J. C. Stenning, Esq., 8; W. S. Hobson, Esq., 7; Rev. H. Palmer, M.A., 6; K. D. P. Roberts, Esq., 5; W. Vanner, Esq., 5; R. Meade, Esq., 4; Lord de Ros, 3; R. Murray, Esq., 3; Capt. F. M. Allen, 3; F. G. Lloyd Esq., 3; R. O. Milne, Esq., 3; A. L. Steavenson, Esq., 3; W. Armstrong, Esq., 3; W. G. Hunter, Esq., 2; F. S. Schwabe, Esq., 2; J. McAndrew, Esq., 2; Lieut.-Col. J. R. Turnbull, 2; W. H. Kirby, Esq., 2; Miss Louisa Coxe, 2; Capt. D. MacNeill, 2; The Hon. Noel Waldegrave, 1; Lieut. J. D. Lysaght, 1; W. W. Unett, Esq., 1.

Class III contains 97 pictures, as follows:—J. C. Stenning, Esq., 11; W. G. Hunter, Esq., 9; J. McAndrew, Esq., 8; Lord de Ros, 7; Rev. H. Palmer, M.A., 6; W. Armstrong, Esq, 6; Capt. F. M. Allen, 5; F. Beasley, Esq., 4; E. Milsom, Esq., 4; K. D. P. Roberts, Esq., 4; Miss Louisa Coxe, 4; G. W. Keeling, Esq., 3; R. O. Milne, Esq., 3; Lieut. J. D. Lysaght, 3; W. S. Hobson, Esq., 2; R. Meade, Esq., 2; Dr. T. Cooke, M.A., 2; The Hon. Noel Waldegrave, 2; A. L. Steavenson, Esq., 2; Capt. D. MacNeill, 2; Miss Fazakerley, 2; R. Murray, Esq., 1; J. H. Ritchie, Esq., 1; F. G. Lloyd, Esq., 1; W. H. Kirby, Esq., 1.

The following prizes were awarded:—

Dr. T. Cooke, M.A., &c., &c., Principal of the Civil Engineering College, Poona, *first prize*, for Nos. 42 and 28, consisting of a large and elegantly-chased silver goblet. R. Murray, Esq., for Nos. 104, 107, and 108—a silver goblet. F. Beasley, Esq., for Nos. 238 and 227—a large volume of photographs by Mr. Stephen Thompson, entitled *Chefs d'Œuvre of Art and Masterpieces of Engraving*. R. O. Milne, Esq., for Nos. 32 and 43—a ditto, ditto. T. Brownrigg, Esq., for Nos. 26 and 27—an oil painting in frame. W. S. Hobson, Esq., for No. 128—a large album elegantly bound in morocco. J. McAndrew, Esq., for Nos. 39 and 41—a silver goblet. Dr. T. Cooke, M.A., &c., &c., for Nos. 14 and 31—a large album elegantly bound in morocco. F. G. Lloyd, Esq., for No. 93—an oil painting in frame. F. S. Schwabe, Esq., for No. 25—an oil painting in frame. J. H. Ritchie, Esq., for No. 13—an oil painting in frame.

Certificates of honourable mention were awarded to W. Armstrong, Esq., R. Meade, Esq., Rev. H. Palmer, M.A., J. C. Stenning, Esq., K.D. P. Roberts, Esq., A. L. Steavenson, Esq., and William Vanner, Esq.

The Earl of Rosse called the attention of the Council to the fact of the award of the prizes taking place so late this year, and proposed that in future no negative shall be received after the 1st of May in each year, with the exception of foreign ones, which may be sent in up to the 15th of the same month. This, after some discussion, was seconded by Mr. Glaisher, and resolved upon by the meeting.

A. J. Melhuish, *Hon. Sec.*

THE PHOTOGRAPHIC SECTION OF THE AMERICAN INSTITUTE.

At a recent meeting of the above Institute, Mr. H. J. Newton, the President, occupied the chair. Among the topics discussed we select the following:—

Vidal's Polychromes.

Mr. Anthony having read the account of the meeting of the West Riding of Yorkshire Photographic Society, at which some account was given of M. Vidal's polychromes—

The President remarked that there seemed to be little expression of opinion in regard to these pictures, and there could hardly be any until they knew more of the process by which they were made; at any rate, they should know something about the price. As a commercial article the price had as much to do with their value as anything else, for the cost might make them useless as a commercial article. It appeared that the process by which these pictures were made could not be otherwise than expensive. The value of an article also depended very much on the facility with which it could be produced, and it might be said that, in most cases, the lower the cost the greater the value as a trade article. These pictures were said to be durable, but the fact of their being in colours was no guarantee of permanency.

Mr. Brown said that formerly he had done much in the way of painting. He saw nothing artistic in these pictures to commend. In half-an-hour he could make much better tints than those shown. The colouring was of the character of those seen on fancy boxes, tea-trays, and dry goods' packages; and if Mr. Anthony had not brought them there he would have thought them to be mere chromos. of that quality.

The Secretary thought that the pictures were not sufficiently artistic to lead the public to pay a high price for them, and, being made on a series of films, there must be more or less uncertainty in regard to one being a duplicate of others. Possibly several experiments must be made in order to have them come to the proper tint or colour. Some five or six films would seem to be required to make these pictures, and therefore their production must be expensive and tedious, and hence he did not think they would be much called for. They would, therefore, be of little marketable value and be used only for mere ornamentation.

Bromides in Albumenised Paper.

The President said that, in reference to the use of bromide in albumen for making prints, it appeared to be a matter of considerable importance in Europe. The journals there published much of what was said and written in regard to its effects. Now this was a very old thing. Mr. Anthony knew this, as some years ago he took a trip with him to the Alleghany Mountains, where they made a large number of exposures on dry plates, in printing from which they tried a number of experiments. The ordinary albumen paper would not make such pictures as they could wish, so he (the President) got Mr. Hovey to make some

paper more suitable for the work. He went entirely through the whole series of chlorides and bromides, excessive bromide and excessive chloride, with variations. These experiments he stated to the Photographic Section at the time. With Mr. Hovey's paper he used only one grain of bromide of ammonium and six of the chloride of ammonium to the ounce of the albumen. He merely mentioned this as it was now becoming a prominent matter, and even brought forward as something new and important. The paper gave all the details as to preparation.

Mr. Chapman remarked that it had been shown from the remarks of the President how necessary it was that every practical idea and experiment should be published at the time. Experiments that they had tried long ago they saw every now and then published as something new and original. They had now every facility for making their experiments and discoveries known and recorded. At their meetings reporters were present, and the photographic journals were open to set forth anything new and remarkable. Any little matter tending to improve the art should be published; and all experiments should be carefully recorded in their minutes, so that anything mentioned at the meetings could be referred to at any time.

Mr. Anthony said that when the President mentioned to him the use of the bromide he tried it, and found that its effect was similar to that of washing the excess of nitrate of silver from the paper. The printing in the dark parts would proceed to a certain degree of depth, and a longer exposure to the action of the light would produce no more effect in them, but would allow the printing to go on through the dense part of the negative, so that a soft, harmonious print could be produced from a hard negative.

The President stated that the proportions to be used of the bromide were marked on the paper Mr. Hovey made for him; but a trace—say one grain of the bromide of ammonium to six of the chloride of ammonium—could be used with advantage.

Dr. Miller stated that by a peculiar mode of developing he found it was posssible to make a very fair positive—what might be called an "ambrotype"—on an emulsion plate, using the alkaline developer, and adding the carbonate of ammonia and a very small amount of pyrogallic acid. The image, after being fixed, had a white, creamy colour. What the exact proportions were for producing this effect he had not yet determined. He brought some of the plates with him for inspection. He would state, however, that in making an ambrotype by the emulsion process, most of the development was produced by the alkali. The pyrogallic acid was in very small proportions; some of his solutions had contained as little as one-fourth of a grain to the ounce, but the ammonia had been very strong. The specimens possessed no particular merits as ambrotypes, but they merely showed what could be done.

Mr. Anthony said he had recently occasion to make some pictures in a patent case, in which an old-fashioned plate-holder had a mat or card board diaphragm, which would be injured by using a wet-collodion plate in it. It was necessary to produce a picture by means of this apparatus, and the construction of it was such that it became necessary to use a ferrotype plate to fit the picture on; consequently, a ferrotype plate coated with bromide emulsion was used, and, after exposure, developed, a very fine positive picture being produced.

Talc as a Substratum.

Dr. Miller inquired if the talc spoken of at their meetings was generally used as a substratum. There were occasions when they could use the wet emulsion plates with advantage. Now, if the plate were clean and no substratum were used, the emulsion (some particularly) would wash off. Quite a number used talc or French chalk to remedy that. It was found that the film adhered very closely to the plate by simply rubbing the talc over the plate and polishing it so as to leave a very moderate quantity on the plate. It was very annoying to have the film washed off and go down the sink.

The President remarked that the use of talc was first published in the European journals, and Mr. Bierstadt was the first to use it. Sometimes the albumen would hold to the plate well enough, but he found that the use of talc *always* produced certain results. The film would adhere to the plate very closely, and the talc obviated the slipping better than anything he had heard of or used. It was preferable to wet substratums like gelatine solutions—which, if they were not very careful not to have any floating dust around, and such dust in particular as floats in a photographic room would cause little spots to make their appearance when beginning to develope—as, when talc was used, the plate could be dusted off before the collodion was put on. Those who are not familiar with its use would be surprised upon seeing how well it worked. The fraction of a grain seemed to be sufficient.

Mr. Anthony said that this substance was not soluble in water, and did not contaminate the bath in the least.

Mr. Gardner remarked that one reason why albumen had been used by practical photographers was that it saved time and labour. They simply placed their plates in water, and while they were still wet the albumen was flowed over them, and they were then allowed to dry. This was done in about one-third of the time that would be occupied if the plates were washed and dried. There was no doubt that they would never abandon that mode of treating their plates unless they could find the French chalk to answer the same purpose. The usual method saved labour, as they would not have to clean their plates.

Mr. Chapman remarked that, with the method spoken of by Mr. Gardner, the saving of labour seemed also to be a means of covering up dirt.

The Secretary said that some time ago he gave his plan for cleaning plates, but he had not seen any one who used that method. He did not know whether its disuse was from a lack of knowledge or because photographers did not consider it of much account; but it seemed to him to be the simplest and surest—that is, unless a substratum be used. He merely washed the plates under a tap. When washed they were placed on a piece of blotting-paper to slightly drain (but were never allowed to dry); they were then wiped with linen towels, used only for this purpose. These towels were washed in soda alone, no soap or greasy substance whatever being employed in their washing. A towel would clean fifty plates. He very seldom found any streaks on the plates so cleaned. The hand must not come in contact with the plate in any way. Fifty plates could be cleaned quicker in this way than twelve by the other process.

Mr. Anthony said he could bear testimony to the utility of the Secretary's method of cleaning plates. He had repeatedly seen its value tested.

VIENNA PHOTOGRAPHIC SOCIETY.

The last meeting for the season of this Society was held on the 13th June,—the President, Dr. Hornig, in the chair.

The minutes of the previous meeting having been read and approved,

The President laid on the table a notice, received from the Minister of Commerce, in which the Society was invited to contribute exhibits to the International Exhibition which it is proposed to hold in Paris, opening on the 1st May and closing the 31st Oct., 1878. He stated that, in replying to the notice, the Committee had unanimously resolved to urge the following points:—

1. *The advisability of deferring the Paris Exhibition for at least a year longer*, because now-a-days these great exhibitions succeed one another so rapidly that it is scarcely possible any remarkable progress should be discernible in the display; so that, if these exhibitions are not intended to sink into mere monster showrooms repeatedly furnished with the same goods, it is of importance that a greater time should be allowed to elapse between them in order to bring more distinctly into view the actual advance made. Of late, besides the International Exhibition at Philadelphia and the present Exhibition of Art and Industry at Munich, which have followed closely on the heels of the Vienna exhibition of 1873, and which are accessible to photographers, there have been a large number of exclusively photographic exhibitions, the result of which has been to bring the conviction that an interval of two or three years must be regarded as far too short.

2. *The necessity of classifying photographs as a separate department distinct from other industries.* Photography forming a link between art and industry, and as an auxiliary to scientific investigation ever increasing in importance, this arrangement would benefit all, and would permit of its being judged, as it can only be properly done, by duly-qualified professional men. A department of photography also presents this advantage—that it may be made to include all the apparatus and requisites for the production of photographs, these objects being thus much more easily appreciated and properly judged than if each were exhibited according to the branch of industry which produced it.

3. *The desirability of concentrating the exhibits of Austrian photographers*, as can most easily be done by using the organisation of the Photographic Society of Vienna, as the basis of a collective exhibition in which all the branches of photography cultivated with success in Austria shall be represented, as well as all its applications. This plan has already been tried at several exhibitions, and recommends itself especially as the most likely method of getting the actual work of the preceding year to the exhibition. It, however, demands extraordinary exertions, which could only be undertaken if the collective exhibition were subsidised. The only way in which the apathy with which frequent exhibitions are regarded in photographic circles can be assailed is that, in general, the exhibitor should only have to bear the cost of the production of the picture, the cost of a suitable frame with glass, the carriage to and from the exhibition, the insurance, and the watching, as was customary in the case of pictorial works of art at former exhibitions, being defrayed from the fund voted for exhibition purposes, in which case the transfer of the organisation of the photographic department of the collective Austrian exhibition to the Photographic Society of Vienna would be highly advantageous, not only to the individual exhibitors, but also to the exhibition funds.

4. *The reformation of the system of awards* so as to bring it more into accordance with the needs of the times, in so far as is expressed by the recognition of special productions, and the offering of special prizes opening up competition in works which are calculated to further the development of the different photographic methods in their relations to science, art, and industry.

No remarks being made by any member present,

The President proposed that a draft embodying the above points should lie at the *bureau* for about eight days in order that any further suggestions from any of the members might be included before forwarding the reply to the Minister of Commerce.

The proposal was unanimously agreed to.

In reply to an inquiry made by Herr Löwy,

The PRESIDENT said he had been informed that at the exhibition at Munich the photographs are very favourably placed, most of them facing a good north light. A number of interesting objects were then exhibited, amongst which were a complete collection of reproductions of Preller's Odyssy-landscapes, taken from the original frescoes in the museum at Wiemar, by Herr Schwier, of that city; a series of views of the Dachstein group, by Professor Simony, by which he illustrates his theory as to the scientific use of landscape photography; a copy of Dr. van Monckhoven's *Traité Pratique de Photographie au Charbon* and of M. Liébert's *La Photographie au Charbon Mise à la Portée de Tous;* some lichtdrucks, by Brauneck and Maier, in which the picture and the letterpress are printed simultaneously; and, though last not least, some of M. Vidal's photochromographs. These last were examined with great interest, as was a Vidal's photometer. The President said he had merely had a glance at the last-named little instrument; it appeared to him to be constructed on the same principle as Dr. Vogel's, but to be handsomer and more convenient.

The President laid on the table two letters from Herr Tiator, of Colmar, which were accompanied by several *carte*-sized portraits prepared in a particular way, supposed to facilitate the retouching (spotting), and to make it more efficacious. Herr Tiator says:—

"The undersigned has, after many trials, discovered a very simple, easily-manipulated, efficacious process by which printed albumenised paper acquires the property of taking, on the retouching, colour easily. Its advantages are twofold:—First, sometimes the work goes on smoothly enough, at other times there is a texture which even the most careful stippling cannot make fine enough; with this process the desired texture comes almost of itself. Secondly, after this treatment the pictures are much deeper in tone, while the gloss on the paper is increased, and is even communicated to the retouching, from which it withdraws the eye. I send four small photographs the picture sides of which are prepared according to my formula. They have at present the appearance of having been breathed upon, being dim and soft; yet retouch them, and afterwards polish them well with a soft rag or a piece of flannel, then a spirit, a depth, and a gloss appears which the albumenised paper alone is incapable of imparting to them. All the manipulations are so far from complicated that I can entrust them to my child. The day's work of six retouchers can be prepared by a single person in a quarter of an hour, at a cost for materials of about three krewtzer. Should you approve of the results you obtain with the enclosed I undertake to furnish, for 1½ fl. (about 3s.), with directions for use, sufficient materials for the preparation of all the pictures printed upon a whole ream of albumenised paper."

In the second letter Herr Tiator said that if they would give the enclosed pictures a further trial they would be convinced that a doubtful property of his process—namely, the sticky feeling of the pictures before and after polishing—had been removed, and that it made the retouching of salted as well as albumenised paper both quicker and easier.

Herren Gertinger, Jenik, and Fritz Luckhardt took the specimens with them, promising to report results at the following meeting.

Dr. J. M. Eder read an essay in which he communicated the results obtained by himself and Captain V. Tòth with respect to the employment of ferrous sulphate of soda in the development of negatives. The conclusion he arrived at was that the said double salt could be recommended as a cheap and excellent developing medium.

The President showed a specimen of the powdered silica which has been placed in the market as a suitable substance for cleaning negative glass by the firm of Gebrüder Grüne and Hagemann. He invited the members to experiment with the material, and offered to send some for that purpose to anyone who wished it.

Some phototypes, sent by Herr Herter, and produced by a peculiar process without either asphalte or chrome gelatine, were then examined, the President explaining that he was negotiating for the production of a plate.

Two questions which had arrived by post were then opened. The first ran as follows:—"What is the most suitable and convenient way of photographing ceilings and floors of old castles? Is there no contrivance for doing so with an ordinary lens without tilting the camera either upwards or downwards?"

Dr. SCHIMANN said such views could easily be taken with the aid of a prism.

The PRESIDENT mentioned that he had seen an English photographer use for that purpose a mirror inclined at an angle of 45°.

Dr. SCHIMANN thought the upper surface of the mirror must have been silvered.

The PRESIDENT agreed that in the one observed by him such was the case.

The second query was as follows:—"Does anyone know anything about a new invention of the photographer, Herr Winter, of Prague, which is said by rumour to consist in an incredibly speedy and cheap way of producing enlargements? Has anyone yet seen any of these enlargements?"

Dr. SCHIMANN said that he had lately been in Prague and had seen some enlargements at Herr Winter's, which appeared to have been produced by development, but were very much retouched.

The PRESIDENT then closed the meeting with the remark that the next meeting would be held in October at the end of the usual summer recess.

Correspondence.

THE MEZZOTINT VIGNETTE.

To the EDITORS.

GENTLEMEN,—About August, 1872, I sent you some card vignette portraits, with stipple printed on the background only, and in your Journal you stated they were very pretty. As the stipple is now the subject of a patent, will you kindly publish this letter.—I am, yours, &c.

298, *Clapham-road, S. W., July* 31, 1876. DAVID REES.

[We recollect quite well the portraits sent by Mr. Rees. We received them in the middle of *June*—not *August*.—EDS.]

THE GELATINO-BROMIDE PATENT.

To the EDITORS.

GENTLEMEN,—You have allowed Mr. G. S. Penny to make some remarks in your last issue on what I said at the meeting of the Photographic Society of Great Britain.

I do not propose to discuss Mr. Kennett's patent, but in justice to me I beg you to print Mr. Johnston's letter of November 14, 1873, and an extract from Mr. Nelson's specification for drying gelatine, dated 1839. Dr. Maddox's formula for gelatino-bromide was published on September 8, 1871, but it is too long for me to ask you to reprint.

In addition to asking you to print the following two, I have sent Mr. Penny a copy of Mr. Kennett's specification of Nov. 20, 1873. On comparing all the wording of these, and their dates, he will, I think, form a somewhat modified opinion of the "originality" and "ingenuity" shown by Mr. Kennett.—I am, yours, &c., H. STUART WORTLEY.

Rosslyn House, Grove End-road, N. W.,
August 2, 1876.

Extract from Nelson's Patent, No. 8010, *A.D.* 1839:—"I then remove this gelatine from the settling vessels in the manner which I have already described, and I pour it upon the cooling slabs as already pointed out, and allow it to remain upon these slabs until it becomes cold and sets into a firm substance. I then cut it into pieces of a convenient size, and dry it on nets by exposure to a current of cool dry air, and when it has been thus completely dried it is fit for use."

[We have not reprinted Mr. Johnston's *Hints to Gelatino-Bromide Workers,* because those of our readers interested in this matter are either intimately acquainted with it already or can refer to it in our pages. See our number for November 14, 1873. With respect to Nelson's patent: it must not be lost sight of that his invention was for a method of drying simple gelatine, whereas Kennett's patent has reference to desiccated gelatino-bromide of silver, which was quite unknown in 1839 when Nelson obtained his patent. It cannot be too generally known that a combination of two or more old and well-known things may form a new and valid patent.—EDS.]

RESTORING FADED COLLODION POSITIVES.

To the EDITORS.

GENTLEMEN,—A collodion positive on glass taken many years ago and now badly faded has been placed in my hands for restoration, and as I have looked in vain through the back volumes of the JOURNAL and ALMANAC for information concerning the best method of effecting such restoration I apply to you for the required information. The picture is highly prized by the owner, and I do not care to try any experiments on it; hence I prefer a request that you will kindly inform me of a good method by which it can be restored.—I am, yours, &c.. J. N.

Cornhill, E.C., August 2, 1876.

[The first thing to do is to remove from the positive all the black varnish, if there be any. If this varnish be on the back of the glass it may be scraped off with a knife; but if, on the contrary, it has been applied upon the collodion film, the picture must be laid, face up, in a flat dish nearly full of benzole. This ought to be covered over with a plate of glass to prevent evaporation. It may now be judicious to obtain a transparency from the picture in anticipation of accidents. By means of a dry plate and giving a short exposure a strongly-defined transparency will be obtained by superposition. An exposure of ten or twelve seconds to a gas flame will be sufficient. Now flood the faded positive with equal parts of alcohol and water, followed by plain water; and before any portion of the surface becomes dry apply a twenty-grain solution of cyanide of potassium of the strongest kind. The picture will immediately brighten up. But if the cyanide be good it will after a very brief period begin to attack and eat away the deepest shadows; to prevent which the operator must have a vessel of water close at hand, and when the best effect has been obtained, and the shadows are just about to be attacked, he must stop the action by a copious application of water.—EDS.]

EXCHANGE COLUMN.

No charge is made for inserting these announcements; but in no case do we insert any article merely *offered for sale*, that being done at the small cost of one shilling in our advertising pages. This portion of our columns is devoted to exchanges only. It is imperative that the name of the person proposing the exchange be given (although not necessarily for publication, if a *nom de plume* be thought desirable), otherwise the notice will not appear.

A 10 × 8 portrait and group lens by Ross will be exchanged for a Ross, Grubb, or Dallmeyer *carte* lens in good order.—Address, J. Catterall, 158, St. Helen's-road, Daubhill, Bolton, Lancashire.

Four sky-lights four feet square, and two ends to form a complete top, will be given in exchange for a rolling machine or standing head-rest. Address, J. Sargood, photographer, 6, Chryssell-road, Vassall-road, Brixton.

ANSWERS TO CORRESPONDENTS.

Photographs Registered—

A. Marschall, Mirfield—*Two Views of Robin Hood's Grave, and two Views of the Gatehouse of Kirklee's Priory.*

☞ *Correspondents should never write on both sides of the paper.*

A. B.—Apply a mixture of starch in cold water to the glass.

A. Marschall.—Thanks for your offer. The photographs are very good.

Charles Waldack (Ghent, Belgium).—Letter and enclosure to hand. Thanks.

G. W.—See append to Mr. Turnbull's letter in our issue of the 21st ult., page 343. It is *not* an infringement.

J. S. B.—The whole secret lies in the use of gum tragacanth instead of any other substance of a similar nature.

Carboniensis.—Bichromate of potash is an active poison, but we are not aware of the precise quantity that constitutes a poisonous dose.

Rev. J. H. M'Kay.—Paper prepared in the manner you indicate will answer extremely well for using with Mr. Warnerke's roller slide.

B. Sexton.—Tombac is not a chemical; it is merely a kind of brass containing a larger proportion of zinc than usual—something closely allied to spelter solder.

H. J. A.—We are not aware of there being any agent in this country for the sale of Voigtlander's portrait lenses. Callaghan, of New Bond-street, was the agent several years ago, but whether the agency is still retained we are unable to say.

J. T. Clarke.—On looking over some stereo slides obtained from Messrs. Anthony & Co., of New York, we find the American views named by you; hence you have merely to send the order direct to them to ensure its being executed.

Quiz.—You are only quizzing. We were quite right in saying that a certain process was the best—and so it was (twelve years ago) at the time we said so; but great changes and many advances have been made in photography since that period.

B. S. Stewart.—No; there is no definite rule for placing a sitter, although there are certain canons of art that must not be disregarded. Cultivate an artistic taste, and study very closely the positions of the portraits of recognised masters in this department of art.

Amateur.—"Photographic ink," if composed of the same ingredients as those of which it was made about seven or eight years ago, ought to be avoided as a quack nostrum. At *that* time it contained a large proportion of nitrate of potash and a very small proportion of nitrate of silver.

Half Plate (Bolton-le-Moors).—We do not at all recommend the apparatus you name; it is much more expensive than an ordinary good portable camera, and is unsound in principle. Obtain a bellows-bodied half-plate or cabinet-size camera, an ebonite bath with a watertight cover, and a portable box tent of sufficient dimensions when closed to serve as a packing-case for the camera and chemicals, and you will then have an outfit which will enable you to do good work with certainty and comfort.

Manchester Man.—The "two-crayons" style of portraiture may be very easily produced by means of photography. First print the portrait in the usual way, and then stop out the portions that are desired to be protected, using for this purpose china ink or any other opaque substance. Next expose the picture to the light until the tone becomes lowered to the required degree, and then wash, tone, and fix. The protecting touches of opaque ink will have been washed away, and the portions protected will be white, sharp, and very effective, provided that artistic skill has been displayed.

A Reader.—The only suggestion we can make, with regard to the greater length of exposure now required than that which you gave when your studio was first erected, is that the glass has become tinged with yellow or some other non-actinic colour. This can easily be ascertained by the removal of a pane, which should then be subjected to a suitable examination. If the glass be found to be right you must next examine the lens; for it occasionally happens, from some cause or other, that a lens which, when new, has worked rapidly becomes slower after some time. Occasionally the glass of which the lens is made becomes discoloured; but this is only when it has been subjected to the action of powerful light. More commonly an increased slowness in lenses is caused by the discolouration of the balsam with which the component parts of the front lens is cemented, and which, from contact with the brass of the cell, sometimes becomes stained of a greenish-yellow colour.

J. Thomson.—A lens that gives very sharp definition on a slightly-hollow field will have that field flattened if the distance between the front and back lenses be increased; but this gain will be attended with a slight lowering of the marginal definition. We are not acquainted with the lens you name, but it is likely to be a good one.

J. B. (Helston).—1. Do you mean that the enamelling pellicle, although adhering to the albumen print, will not do so to the edge of the mount? If such be the case you must apply an extra coating of gelatine.—2. A pure carbon print will not fade; but it is possible to mix up with carbon certain colouring matters to improve the tone, and these colours may fade. Respecting the durability of silver prints, we refer you to what we said in the Journal a fortnight ago.—3. You should obtain a pair of four-and-a-half-inch focus stereoscopic lenses. These will include a wider angle. We are not, however, quite certain of your meaning. It will be better to send us a specimen picture.

South London Photographic Society.—On Saturday last a large number of the members of this Society availed themselves of the annual invitation of their President, the Rev. F. F. Statham, M.A., F.G.S., to spend a social evening at his residence. After dinner, the toasts incident to the occasion were duly given and responded to—the toast of the evening, "Success to the South London Photographic Society," having been given by the host, and responded to by Mr. E. Cocking, secretary. The "Photographic Press" was acknowledged by Mr. J. T. Taylor. Mr. Samuel Fry, in proposing the health of the President, reminded the members how much the prosperity of the Society was owing to the geniality, tact, and ability of Mr. Statham—a sentiment which met on this occasion, as it always has done, with the most genuine approbation. The meeting was one of the most pleasant of those always agreeable annual *réunions*.

A Good Example.—Messrs. Ross and Pringle, of Edinburgh, taking advantage of the photographers' annual holiday, on Thursday the 27th ult., and knowing from experience the advantage derived from the occasional free and easy intercourse between employers and employed, carried off the whole of the members of their establishment to Lochgoilhead, determined to have a thorough change both of air and scenery. They started, per Caledonian railway, at 6.30 a.m. for Greenock, and after two hours' inspection of that busy town, including the shipping and the famous *Iona*, with its wonted tourist-crowded decks, went on board the *Carrick Castle*, and sailed through the beautiful scenery to the head of the loch. After some time spent in admiring the grandeur of the scenery, and taking a photograph, which is intended to be copied and used as a background for the ever-popular boat, they sat down on the banks of the Goil, and laid the cloth under the spreading branches of a great oak. Mr. Ross took the chair, and under his genial rule ample justice was done to a well-selected and plentiful repast, zest for which was abundantly supplied by the beauty of the rippling river at their feet, and the grand old mountains behind. After dinner the party strolled back to the head of the loch, and some of them indulged in the pleasures of boating till the arrival of the *Windsor Castle*, in which they embarked for Greenock, whence they took the express train for Edinburgh, where they arrived at half-past eight o'clock, all highly delighted with their pleasant excursion.

☞ Editorial Communications should be addressed to "THE EDITORS"—Advertisements and Business Letters to "THE PUBLISHER"—at the Offices, 2, York Street, Covent Garden, London, W.C.

METEOROLOGICAL REPORT,

For two Weeks ending August 2, 1876.

Observations taken at 406, Strand, by J. H. Steward, Optician.

These Observations are Taken at 8 a.m.

July.	Bar.	Wind.	Wet Bulb	Dry Bulb.	Max. Tem.	Min. Tem.	Remarks
20	30·24	W	62	68	84	63	Hazy
21	30·21	E	63	67	83	60	Hazy
22	30·09	SE	65	72	90	62	Hazy
24	30·00	NE	57	60	71	57	Dull
25	30·20	NE	59	66	84	57	Hazy
26	30·09	W	59	64	83	58	Fine
27	30·04	N	54	63	75	59	Bright
28	29·77	W	58	63	69	58	Dull
29	29·93	NW	55	62	75	53	Cloudy
31	29·69	SW	61	65	70	59	Raining
August.							
1	30·02	NW	51	59	70	49	Cloudy
2	30·12	SW	58	64	72	52	Cloudy

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THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 849. Vol. XXIII.—AUGUST 11, 1876.

SOME FURTHER NOTES ON ALKALINE DEVELOPMENT.

Notwithstanding all that has been written on the subject of alkaline development, and the impetus it has undoubtedly given to dry-plate work, the theory on which it is based is still very imperfectly understood, and it offers a wide field for interesting and profitable research to those who have time and talent to devote to the undertaking.

It is not our intention at present to notice the various theories which have been proposed, or to suggest anything that may seem to be more satisfactory than any of them; but, as we have been for some time experimenting with another object in view, and have met with one or two (to us) hardly-expected results, we propose to jot them down for the benefit of those interested in the subject.

During the last few months the question has been repeatedly asked—What is the effect of varying the strength of the pyrogallic acid in the developer, and what benefit is likely to be derived from such variation? We know that incidental observations affecting the question are scattered over the pages of this Journal during the past two or three years, but are not aware that any systematic series of observations have been recorded.

We commenced our experiments by preparing a number of plates with an emulsion adjusted in the manner recommended by us a few weeks ago, and containing the faintest trace of free bromide. It had been sensitised for about ten days, and was in excellent working order. Desiring, for various reasons, to get rid of the usual substratum of albumen we ran a line of rubber solution round the edges of the plates, and found it to answer admirably. For a test object we selected a large bouquet of flowers, which, when judiciously arranged, is perhaps of all objects the most suitable for the purpose, giving, as it does, every variety of shade, from perfect opacity to clear glass.

Having ascertained that an exposure of thirty seconds in a well-lighted studio gave, with the ordinary strength of developer, a satisfactory result, a large number of plates was exposed in threes for varying periods, from ten up to ninety seconds. From previous experiments we believed that a standard solution of fifty grains of carbonate of ammonia to the ounce of water, with just sufficient bromide to prevent fog, was, generally speaking, the best for ordinary purposes, and so used it throughout the whole series in question, the only variation being in the amount of pyrogallic acid, which extended from one-third of a grain up to six grains per ounce. A detailed statement of the whole of the experiments would occupy more space than we have at our disposal, and therefore we must confine ourselves to the practical results. Supposing, for the sake of convenience, we assume that the pyrogallic acid possesses the power of decomposing the light-affected silver bromide, combining with the liberated bromine, and leaving the free silver in its original position, the larger the proportion of the pyrogallic acid the more rapidly is the image formed, and the freed silver is greater in proportion in the parts most affected by the light. Not only greater in proportion to the light, but greater in an increasing ratio, so as ultimately to be out of all proportion if the exposure has been too short and the pyrogallic acid solution strong. The converse is, of course, equally true—a weak solution of pyrogallic acid developing slowly, and the best-lighted parts not becoming opaque even under protracted development.

In practice, then, it will be found that by varying the strength of the pyrogallic solution considerable latitude may be allowed in the exposures, without materially affecting the ultimate result; and the rule—which we think will hold good under most circumstances—is the shorter the exposure the weaker should be the pyrogallic solution, and *vice versâ*. By this means an under-exposed plate may be developed into a good negative, or at least into one that shall be free from hardness; and one that has been much over-exposed may prove rich in contrast, the strong solution building up the high lights, and so preventing the flatness so characteristic of long exposures.

For the purpose of ascertaining the extent to which an exposed film would be affected, we immersed a plate in a one-to-ten solution of ammonia, and were somewhat surprised to find it rapidly developed into a really good printing negative quite free from fog, and that without a trace of pyrogallic acid. This was repeated several times, and in each case the resulting negative was fuller of detail and altogether better than similar plates developed in the usual way. We next prepared some plates with a preservative or organifier of pyrogallic acid, and found that the simple solution of ammonia developed them also with great rapidity up to full printing density, but failed altogether to get an image on plates to which neither tannin or pyro. had been applied; and we could find no trace of bromine in the ammonia in which they had been immersed, although its presence was readily detected in that by which the others were developed.

Similar plates were immersed in a three-grain solution of pyrogallic acid, and after the lapse of half-an-hour a distinct but feeble image was obtained, which, on immersion in the ammonia, rapidly acquired sufficient intensity, and the solution then, on being subjected to the usual tests, gave clear indication of the presence of bromine.

From these experiments it would seem that pyrogallic acid possesses the power, although to but a limited extent, to decompose silver bromide on which light has acted, and that this power is much increased by the presence of an alkali, although how the latter acts is not quite clear. From another circumstance, which has been noticed before, it is evident that oxygen materially assists the pyro. in its action, as after the development has fairly commenced it is found to go on much more rapidly when the solution is poured off and the plate left merely moist than when it is left on in sufficient quantity to flood the plate.

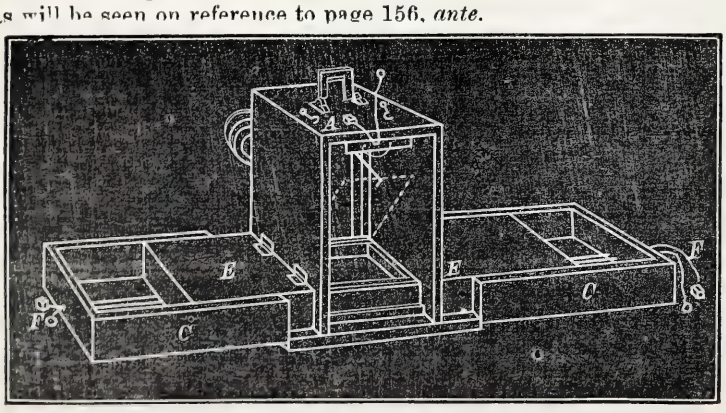
A NEW FIELD CAMERA FOR WET COLLODION.

The strong desire expressed by amateur photographers for combining the ability to work the wet collodion process in the field with an entire immunity from tents or other cumbrous apparatus has given occasion for the development of much mechanical ingenuity. How far any of the various cameras now in use which permit a plate to be prepared and developed within their own precincts, so to speak, have succeeded in displacing tents or developing-boxes is a subject which need not engross our attention at present.

To the existing appliances for working the wet collodion process in the field must be added another. A few days since we received a visit from Mr. W. A. Brice—a gentleman possessing much ingenuity, and whose name, as associated with investigations in connection with certain preservatives for dry collodion plates used by him in Ceylon, in addition to other matters, is not unknown to the readers of our volume for 1865. Mr. Brice has shown us, and has also explained the action of, a new camera he has invented for facilitating wet collodion operations out-of-doors. He appears to have started on this pursuit with a perfect knowledge of what had already been achieved in the direction of his search, being familiar with Archer's camera, in which the manipulations were effected by means of arm-holes or sleeves in the sides, and a yellow glass pane let into the top of the camera; with Newton's camera, in which the various vertical baths were brought below an aperture in the bottom of the camera, through which the plate was lowered down, to be acted upon by sensitiser, developer, or water, as the progress of the operation demanded; with Dubroni's camera, in which the body of the camera itself forms* a common receptacle for solutions of nitrate of silver, protosulphate of iron, and any other solution which reacted upon the sensitive film without the intervention of light;—all these generic forms, and probably their ramifications, had been known to the inventor of the apparatus, the subject, not the substantive form, of which is now before us.

The leading idea in Mr. Brice's mind appears to have been (we cannot say that it really *was* so) the reducing of the mere mechanical operations of sensitising, developing, and washing a negative to the pulling of so many strings. A collodionised plate is placed *in situ*, a certain string is pulled—a string terminating, if preferred, in a silver knob, for silver is cheap at present—and down goes the plate into a *flat* bath containing the argentiferous solution. We italicise the word "flat," because vertical baths have hitherto been employed for this purpose. After exposure another string is pulled, the effect of which action is the lowering down of the plate into the developing solution, contained still in a *flat* bath. So with the fixing and washing—everything is reduced to the pulling of a few strings; and if this be not a "royal road" to photographic manipulation it will readily be conceded that it approximates towards that desideratum.

We shall now endeavour to describe in what manner these manipulations are effected. The camera proper, in which the focussing and exposure take place, is flanked on each side by another chamber or box, which is hinged to permit its being laid down at right angles to the camera itself. At this stage we must have resort to the aid of a diagram, selecting a view which approximates to that prepared to illustrate the specification; for this camera is the subject of a patent, as will be seen on reference to page 156, *ante*.



In the above, which is a back view, the camera proper is represented by A, the hinged side pieces by C C. These, as we have said, are so hinged as to fold up on each side of the camera, and when so folded are fastened by hooks shown on the top of the camera. E E represent lids which, when lifted up, allow of trays containing the necessary solutions being placed there. These trays have one end covered so as to form a well; and, although they are to be used when in a horizontal position, yet, through the agency of such well, the solutions will not be spilt when the trays are reared up on one end, as will be the case when the side wings C C are brought up to the sides of the camera. These well-trays are merely deep dishes formed of "carton durci"—a kind of hardened millboard. Ebonite, it is obvious, will answer the purpose quite as well. One end of the tray being covered over to form a well, it can be reared up without allowing any liquid to be spilt. By means of strings F F, shown at each end, any tray or dish placed in the case C may be immediately brought underneath the camera A.

But in what manner, it may now be asked, is the plate to be held, and in what mode is it to be immersed in the various baths? The way in which Mr. Brice does so is exceedingly ingenious. A simple square wooden frame which, when *in situ*, is at right angles to the axis of the lens, is fitted with three long silver projecting wires—two below and one at the top—which form clips by which the plate is held. These wires are about two inches long, and the wooden frame into which they are fixed is hinged at the bottom. This frame is operated on by strings, as shown at the top of the camera in the diagram, and by easing or pulling one of these the frame is placed in a horizontal position, by which means the plate at the outer end of the three silver wire clips is lowered down into any of the baths that may have been brought by the strings into the proper position, namely, inside the camera. In the diagram a plate is represented as about to be lowered into the bath placed below. The frame itself, in which the three silver projections are fixed, is made so as to slide to and fro in relation to the lens, so as to admit of focussing. It has only to be stated that the back of the camera, here represented as open, is closed by a suitable shutter.

With respect to the development, Mr. Brice has found that the new developer recently introduced by Mr. M. Carey Lea acts admirably for bath development purposes. The strength of the solution is so adjusted that the exposed plate must remain in it for three-quarters of a minute, which portion of time suffices to bring out every detail of a properly-exposed plate, the valuable feature being that the negative will not be damaged if this time be *greatly* exceeded. The same developing solution may be used over and over again.

[* Or *did* form, for it is now eleven years since we published a description of the last one we saw.—Eds.]

ON THE PREPARATION AND COLOURING OF TRANSPARENCIES FOR THE MAGIC LANTERN.

Numerous requests having been made that we would publish a course of lessons on the preparation and colouring of transparencies for the lantern, we have pleasure in commencing this week such a course, which will be continued without intermission until completed.

Chapter I.—Introductory.

I think that scarcely any apology is necessary for the publication of a series of articles on this subject, but rather the reverse, as the lantern has now become so popular from the improved character of the subjects exhibited—thanks to photography—that any hints which will still further improve and advance this special branch of our art must be acceptable to all.

The days have gone by when a few dabs of varnish colour on a piece of glass, exhibited by means of a common oil lamp, attracted the gaze or admiration of wondering sightseers; and the immense flood of art that is being daily poured in upon the public and surrounding them in their daily lives, has produced a generation of critics—from the youngest child to the oldest man—who with undisturbed countenance would gaze at the most wonderful effects short of the figure on the canvas coming to life. This makes it all the more necessary that our motto should be "Each for all, and all for each," so that we may be able to keep pace with the times.

Another reason, and an important one, is this—there are few photographic establishments where an operator's time is fully employed—say a rainy day, or a snowy day in winter, indeed I may say the whole winter through, as there are many days on which a good portrait could not be taken—when slides could be done from morning to night. Many a time has the complaint been made that the winter eats up any good which has been done in summer. Now the manufacture and the demand for lantern slides is specially a winter trade, and if it should only pay expenses it has served a good purpose. If the public came to understand that they could walk into any photographic studio and order slides from any desired subject an immense impetus would be given to the trade, for the simple reason

that shops will not keep in stock anything but the most hackneyed subjects, and of these not more than a dozen of each set. Now it is not uncommon for myself to receive orders for as many as from sixty to seventy of one subject. Then, again, there are many subjects that no one will prepare without a special order, and this is where the practical photographer has the advantage, because he, and he only, can produce these slides.

I fancy that I hear some of my brethren of the camera say—"What you say is quite true, and we knew all this before, but (there is always this 'but') we do not know how to colour the slides, and if we did we cannot devote our time to colouring slides. We want something that any of our girls or boys can do who have any taste for this sort of thing; then it would pay, and the public want their slides coloured, or not at all." This brings me to the object which I have in view, namely, to give a few hints which will enable the merest tyro who can handle a brush to colour lantern slides with effect and quickly. I do not profess to teach the art of colouring as an art, but to enable anyone who has the ability to simply tint a *carte de visite* to do this work; and, as in every well-managed establishment there is always some one to do the colouring of *cartes*, &c., this new branch will also fill up his or her time, with this advantage—that the colouring may be done in gaslight, if necessary. For young ladies this is an agreeable, light employment, and one to which they will take readily, as they might be well remunerated, with profit to their employer.

Chapter II.—On the Proper Kind of Negative.

Before entering into the subject of colouring, I wish to say a few words on the taking of the negative for this purpose, and also explain how I take my slides. As every photographer has his own pet process, by which he produces results which in other hands would prove a failure, I would recommend the taking of the negative by that process, be it wet or dry. But for those who would prefer being directed in the matter, I will submit the most simple plan of proceeding. As it is useless to say anything of the negatives of landscapes and figures already in stock, and as any good negative used for printing may be made available for this purpose, I will confine my remarks to the copying of engravings, &c. There is a large field here; and in spite of the great cry that has been made regarding copyright, I have found publishers of illustrated works very kind, and willing to allow their illustrations to be copied on glass for the magic lantern, provided the usual permission be asked, and this permission acknowledged on each slide. It is a good advertisement, and does them no harm; but on no account will they allow the printing of these illustrations on paper for disposal or otherwise. Amongst the publishers whom I have found willing to grant this privilege are the proprietors of the *Illustrated London News* and the *Graphic*, Messrs. Cassell, Petter, and Galpin, Messrs. James Nisbet and Co., Mr. W. Wells Gardner, Messrs. Wm. Collins, Sons, and Co., Messrs. Blackie and Son, Messrs. Virtue and Co., and a number of others. Having disposed of this bugbear, what a field is opened up for pleasantly and profitably filling up the leisure time of the willing and careful photographer!

Suppose, then, the necessary permission has been obtained, the first thing to do is to make a set of negatives from the subject chosen; and in choosing the engravings from which it is intended to make up a set, select those that are of an uniform shape. Should there be some of them which are too long or too broad, but which are necessary to make up the set, allowance must be made for this in taking the negative, as part of the picture must be cut away. In every case make the negative larger than the slide is to be if working with the wet process in the camera; but if the slides are to be taken from the negative by the dry process, which some prefer, then the negative must be taken *exactly the size* of the proposed slide. As, however, I do not intend to enter into any of the dry processes, further than making such remarks as will be suitable to both, I will go through the formulæ I have adopted myself—that is, printing by means of the wet process in the camera.

The nitrate of silver bath I use is the same as that employed for portrait or other studio work. Having coated the plate and put it into the bath, the next thing to do is to set up the picture to be copied. If a series of pictures are to be copied from one book the most simple plan to keep the book in its place and to keep the engraving flat is to put a table against the wall, and on the table place a small stool, on which the book is laid, and with two tacks or drawing-board pins stretch a piece of string across to the top of the page you intend copying. One end of the string may be fastened permanently, and the other end rolled tightly round the other pin. On the ground glass of the camera make a square with a pencil at least three and a-half inches, and use 5 × 4 plates for the negative. Endeavour, as nearly as possible, to make the copied pictures exactly one size, as it is as easy to do it at this stage as afterwards, and it saves a great deal of time and trouble, although there is no necessity for rejecting a good negative should it not be the same size, as will be subsequently explained. Having focussed the picture and given a good exposure, develope with the ordinary iron developer, but whenever the picture is well out stop the development at once by washing under the tap. It is quite possible the development might have been continued with some advantage if for printing on paper, but in this case it is imperative that the lines of the engraving should be clear glass. Having fixed the negative, if it be too thin a slight application of pyro. and silver will bring it up to the required density; and having done this, blacken the negative with bichloride of mercury, lay aside to dry in the rack, and go on with the next picture.

Thomas Ross.

AN IMPROVED MECHANICAL PRINTING PROCESS.*

The glasses being in good condition and perfectly dry they must be exposed to the light so as to perfectly indurate that part of the layer next the glass. To do this all the plates should be placed on a level board furnished with a black velvet cover, the prepared sides in contact with the velvet; then the light must be allowed to fall upon the back of the glass. Leave them in this position until a photometer, *à la* Vogel, provided with a band of paper sensitised in the same solution as that with which the first coating was prepared, shows No. 10 grade distinctly. The colour of the plate exposed becomes of a deep brown. The precise degree of exposure, however, is not of vital importance so long as it receives enough to render the bichromated gelatine almost insoluble.

After this exposure the glasses are arranged in a zinc or japanned tin vessel, with grooves placed at regular distances of one and a-half to two centimètres. They should then be washed with lukewarm water so as to remove all the yellow bichromate and leave the layer clear. This requires several changes of water. The best kind of trough is that in which the water is continually flowing in, and removed again by means of a syphon. After they have been long enough in this bath the glasses are drained and reared up against a wall to dry, leaning against blotting-paper. After drying the appearance of the plate is that of ground glass.

The Coating and Sensitising of the Plates.—Provide the following—

1.	Gelatine (well soaked)	45	grammes.
	Distilled water......................	360	c. centimètres.
2.	Bichromate of potash............	7½	grammes.
	Bichromate of ammonia.........	7½	,,
	Distilled water	120	c. centimètres.

These two solutions are dissolved separately by a moderate heat.

3.	Isinglass (flattened and cut in strips)	22	grammes.
	Distilled water.........................	80	c. centimètres.

This third preparation requires a heat of 195° Fah. to effect its solution. After having been dissolved the three solutions above named are mixed and filtered into a hot-water bath, the temperature of which is from 120° to 140° Fah., and this heat must be kept up for an hour and a-half. It is scarcely necessary to observe that a funnel should be used when filtering these solutions.

All the operations indicated for the first layer must be repeated here with the same amount of care, the drying-case being heated as before previous to the insertion of the glasses, which, before being placed there, must be warmed on a hot-water bath to the temperature of 100° to 120° Fah. They must be allowed to remain in the drying-box for two hours at a temperature of 130° to 150° Fah. Some practitioners urge that this last heat ought to be maintained at 195° Fah. in order to make the layer harder. This may be tried, but it is the opinion of M. Albert that a temperature of 130° to 150° Fah. is quite sufficient.

The drying-case ought not to be opened until the desiccation is complete; it will then be found that the plates are of a yellow colour, matt, and uniform. In a pure, dry atmosphere the plates will keep good in the dark for two or three days.

Cte. Ludovico de Courten.

(To be continued.)

NOTES ON PASSING EVENTS.†

By a Peripatetic Photographer.

An editorial article *On Certain Defects in Binocular Portraits*, which has appeared in this Journal, is very suggestive of the fact that when one individual of the *genus homo* looks another in the face, he directs

* Continued from page 344. † Concluded from page 366.

his attention towards only one of the eyes of the individual addressed. Why is this so? Why cannot he look at both eyes—one after the other, of course? What is the etiquette in this matter? Should the address*or* look the address*ee* in the right eye or in the left, or should his visual attentions oscillate between the two, a few seconds being devoted towards, first, the right and, next, the left? Some persons look at the point of the nose of the individual with whom they are conversing, and others look elsewhere; and a few seem to "split the difference" between the right and left eyes and fix their gaze on a point between them—a fact of which the person addressed appears instinctively to be aware. It is the same with regard to a photograph: the bystander has an instinctive knowledge that in one case the person portrayed is looking him straight in the eyes, "soul to soul," while in another he is avoiding the soul-piercing glance and is looking in such a way as to avoid it—between the eyes, or at the point of the nose, if you like, but still avoiding that clear, straightforward gaze so characteristic of the honest, fearless man. There is no doubt that a portrait of this class cannot possibly be taken unless by resorting to the means the Editors have suggested, viz., the use of only one lens at the time.

I have read with much interest the account of Mr. J. B. Payne's "unique dry-plate box" given in this Journal, but have failed quite to grasp the point in which its superiority over the grooved plate-box is apparent. The "unique" is light-tight; but so is the plate-box when closed. Any desired plate can be removed from the "unique;" who will aver that this cannot be done from the plate-box? I observe that the Editors preserve a cautious reticence concerning any advantage the new box may be supposed to possess over the old; but in these utilitarian times one likes, before adopting a new thing, to know definitely in what respect it is superior to the old. In regard to the bulk of plates or negatives, when packed in a plate-box, it is not generally known that it is best to have the grooves in the box sufficiently wide to take in *two* plates—back to back, of course. This system admits of a dozen plates being packed not only closely but safely; and when the lid of the box is opened any one of the collection may be removed at pleasure.

A great "event" during the past month is the number of opportunities that members of photographic societies and the *employés* of photographic places of business seem to have found for eating and drinking to their own and each others' good health, at some distance from their usual domestic or industrial haunts. These little "outings" are exceedingly conducive to sociality and good feeling.

Mr. Thomas L. Taylor, of Chester, did well not to allow his invention for "a press for burnishing photographs" to proceed beyond the stage of provisional registration. If I understand aright the nature of his "invention," he appears to imagine that, if a burnisher be drawn obliquely across the face of a print in one direction only it will not produce any scratching of the print, and that such scratching will be produced not only if the burnisher be moved in a zig-zag direction but also in a straight movement from end to end of the picture. His mistake lies in imagining that lines are formed across the picture at right angles to the movement of the burnisher only when the picture is being passed "squarely" over the polished metal, and not when passed in any other direction, the real fact being that no lines are formed at all by any existing burnisher, provided the face of the tool be kept clean and properly polished.

"Odic photography" is assuredly a most remarkable branch of our art-science, and the public are much indebted to Mr. Henry Collen for bringing it under their notice. I introduce the subject merely to testify the pleasure I feel at finding that Mr. Collen is not only alive and well, but is prosecuting researches in the art of which he was, in point of time, the first professional practitioner. I allude, of course, to photography as existing in the form of prints upon paper, and not in reference to daguerreotype. Query: is not odic photography allied to what has been designated "spirit photography?" and am I taking too great a liberty with such a veteran artist as Mr. Collen in asking him if he be a believer in what I have termed "spirit photography?"

With regard to the washing of prints, Mr. Horatio Ross seems to over-estimate the amount of water required to free them from hyposulphite of soda. While it is quite true that the presence of this salt in a print is apt, sooner or later, to bring it to destruction, it is equally true that a thousand prints can be so thoroughly washed in a quantity of water much less than "a small river" as to bear with impunity the application of the most delicate tests for hyposulphite of soda known to chemists. It is my opinion—and in this I am borne out by several experienced printers—that fading may result from a too great amount of washing; and, while this is true of water generally, it is most decidedly true, in particular, of some of the water supplied to the metropolis. A little water judiciously used is far better better as a preventive of fading than a three-days' soaking in a running stream.

And now, by way of postscript, a word to our worthy Editors, who have been privately taking me to task for what they consider a misuse of the word "amalgam" in my *Notes* in last week's issue. Did I really write "amalgam" *instead* of "magma?"* I am well aware, good sirs, that an amalgam is a mixture of mercury with another metal, but I am also aware that this definition only holds good when it is applied to a metallurgical subject; and although I may have used the word "amalgam" when I ought and meant to have used "magma," I don't mind saying a word in defence of the heterodox position. I spoke of an admixture of crushed ice with an acid, and this is *not* a metallic subject; and hence the word "amalgam" may be just as fitly applied here as in the case of the two insurance companies which *The Times* recently informed us had "amalgamated" their interests. But you may say that this is really a case in which metallic substances are involved, viz., *brass* and *tin*, especially the former, much of which is to be found ingrained in *some* insurance companies. Well, perhaps you are right—there is brass enough in such amalgamations; but what about the mercury? Accepting either hypothesis I am still right, you see!

DESULTORY NOTES ON SILVER DEPOSITS AND SILVER STAINS.

It is, perhaps, worth while to inquire if these terms are synonymous, or if they express entirely different metallic conditions. We know that a stain, in ordinary parlance, means an alteration of colour, and that a deposit is the precipitation of a substance from a previous state of solution or suspension, as the case may be.

In the first instance, a stain results from the contact of a substance with some other, when a chemical action is induced having the effect of altering the colour of one or both of the substances at the point of contact. the colour so developed continuing after the cessation of the chemical action, and the entire separation of the materials that induced it. This kind of stain may be illustrated by the action of a corrosive acid on any fabric dyed with a vegetable colour. Where the acid is applied decomposition of the colour and material at once sets in, producing a stain, which remains after the thorough removal of the acid.

Another kind of stain is that produced by absorption, no chemical action taking place, unless absorption be so called, and may be familiarly illustrated by the application of a decoction of logwood or other vegetable dye to a piece of white calico. No decomposition whatever takes place in this instance, the colour merely being changed.

If, however, the substance producing the stain *remain* a constituent of such stain, with or without any chemical alteration taking place, we may call that a deposit. The familiar ironmould is an example of this. A solution of a salt of iron allowed to remain in contact with vegetable fibre, and exposed to the air, after a time becomes oxidised and produces the well-known mark—the bane of the careful housewife—of a yellowish-brown colour, which is an oxide of iron entangled in the interstices of the material, and this without any change in the composition of the material itself.

A stain may, however, consist of both chemical alteration of surface and absorption of colouring matter and of a deposit combined.

Now, to apply these remarks to silver printing and gold toning. The formation of the image in silver printing is usually regarded as a deposit of metal in greater or less quantity, according to the strength of light brought to bear upon the sensitised surface. This may be the case to a certain degree; but that such an image consists *entirely* of a metallic deposit is, I think, open to considerable question, or that the metallic deposit forms the *greater* part of the image. If silver be deposited in the metallic form or as an oxide the recovery of the metal from its organic support would be a comparatively easy task; and I cannot (making all allowance for the extraordinary extensibility of gold and silver) imagine they would produce the effects we are accustomed to see in silver printing unless accompanied by other effects due to other causes. That silver nitrate will produce a stain on any organic matter in the presence of light is well known, but what constitutes that stain is not so clearly understood. Some chemists consider it metallic silver, and some argentous oxide; but that it is either one or the other, or

* *Note by our "Printer's Devil."*—Such was the miserable caligraphy of the MS. of the article that the hieroglyphics representing the word in question might be held to be not only either of these terms, but a good many others besides.—P. D.

a combination of both with or without other matters, is not satisfactorily determined. If water containing organic matter be placed in the light, with the addition of a little silver nitrate, a voluminous black deposit is formed, the quantity depending on the amount of organic matter present; and, rightly or wrongly, this deposit is *invariably* called by chemists a "deposit of *organic* matter," the weight of the deposit exceeding that of the nitrate decomposed.

It being the case that silver nitrate will produce from a bright, colourless solution of organic matter a voluminous black deposit, and this deposit is not only that of the metal or an oxide of it, but of the *organic* matter contained in the solution, what reasonable objection can there be to the theory that the application of silver nitrate to a *solid* organic surface should not, with precisely the same reactions, produce an organic stain which represents, and is equivalent to, the image of the silver print and to the black deposit from the solution? I confess I can see none. The kind of organic matter operated upon will produce different colours; and the more porous and absorbent the surface the more quickly will an image be impressed, other things being equal—facts leading up to the confirmation of the idea that the silver print consists in a great degree of organic and not metallic matter. Here is a theory the adoption of which would more easily lead to the explanation of fading, which at present seems enveloped in considerable mystery.

That the image of a finished print is entirely metallic is, I think, out of the question; but, for argument's sake, we will say that on the exposure of the sensitive paper to the light the salts of silver become reduced, in which condition they are submitted to the action of a solution of gold, which substitutes itself for the silver thus reduced—a process, to say the least of it, when thoroughly performed, leaving little ground for designating it a silver print. We will, therefore, assume we now have an image in gold in a finely-divided metallic state; and, knowing the permanency, or non-liability to oxidise or change, possessed by this metal, we might safely assume that our picture is permanent. Does experience prove this? Decidedly not; therefore we must adopt some other theory to account for the evanescence of our work, as fading under such conditions should be impossible—the support might get yellow, but the image would not fade.

If proofs were not submitted to the action of the gold—otherwise toned—the argentous oxide contributing to form the image would be extremely liable to change, as by the action of ammonia and acids it is easily resolved into colourless salts. Here, then, organic matter steps in to our assistance, which by taking its share in the formation of the image—the lion's share, I think—requires a different set of conditions to effect its destruction; at the same time the surface which receives the stain—or, in other words, the organic matter which is changed in its appearance, and is in intimate connection with the unchanged portions—is liable to decomposition, easily or otherwise according to its circumstances. If the action of light, however, be so far continued as to bring the surface into a condition similar to that of deposited organic matter, from a solution as already alluded to, toned, fixed, and washed—such a surface will *not* fade at all under the roughest treatment usually accorded to photographic pictures; in fact, very energetic chemical means will have to be employed to destroy the colour.

Albumen, we know, will putrefy and decompose. Silver nitrate acts in a certain measure as an antiseptic, but will not entirely prevent decomposition, providing the circumstances for it are favourable. Coagulated albumen being more difficult to decompose than the unaltered kind, some consider it proof against this disorganisation, which is a fallacious idea. As most of our pictures are made upon an albumenised surface, and consisting, as I think they do, of something more than a metallic deposit, the preservation of the albumen in an undecomposed and undecomposable condition is a *sine quâ non* in the matter of permanency.

Having thus glanced over the conditions of stains and deposits as bearing upon silver printing, I will leave the matter for further experience to confirm or refute. EDWARD DUNMORE.

FOREIGN NOTES AND NEWS.

French Criticism.—Photochromie.—Reproduction of Engravings.

Abroad as well as at home writers for the newspaper press are to be found who descant flippantly about photography without knowing anything of the subject. A critic of the photographs in the French Exhibition, who has been writing in *L'Estafette* concerning M. Firman Girard's pictures, talks of the puerile researches in detail of this artist; a view of the flower market realising "the ideal of photochromie combined with all the inharmonious violences and deformations of perspective which give the *atelier* place before the objective." This has drawn out a sharp rejoinder in the *Journal de Photographie* from an anonymous writer, who accuses the critic of writing on a subject upon which he is quite ignorant—of unfairly attacking the photographs and photochromes, and of rudely depreciating the talents and works, of M. Girard. Nothing, he thinks, could be more puerile than the ignorance of this critic, who does not hesitate to send to a respectable journal the grotesque phrases mentioned above. It remains for M. Vidal to prove to M. Chesneau (the writer in question) that "the ideal of photochromie" does not exactly suit itself to "inharmonious violences" nor to "deformation of perspective." It is M. Girard's affair to accept the criticisms bestowed upon his works; and it is the affair of the editor of *L'Estafette* to insert articles teeming with such rich jargon as given above; but when we read such writings we are forcibly reminded of the old proverb, "*Ne sutor ultra crepidam,*" which so many people forget in these times of high-class journalism. In this little incident, continues the writer, we see the importance of a person knowing something concerning a subject before writing on it.

The theory of photography, it is true, does not occupy many pages in books devoted to chemistry or natural philosophy, but enough is said to prevent anyone from ever forgetting it who has acquired the most rudimentary acquaintance with its manipulatory details. Such an amount of knowledge, small though it be, is quite sufficient to enable a clever writer to introduce amusing and telling photographic *olla podrida* into the newspaper press.

It appears that M. Ducos du Hauron is not the only one who is making experiments in the direction of photochromie; for, at the last meeting of the Photographic Society of France, M. Cross exhibited some specimens he had produced. He explained that three negatives which he exhibited were taken respectively through yellow, blue, and red glasses, and that he published the principle in 1869. He also stated that in using certain coloured substances he obtained his negatives very rapidly.

At the same meeting M. Klerjot, representing M. Ducos du Hauron, showed the members some coloured glasses used by that gentleman in obtaining negatives for the production of his photochromic prints. It appears that it is extremely difficult to obtain the best kinds of glass for this purpose. Referring to one of these plates, M. Klerjot said that the colour was produced by means of a strongly-tinted varnish; and in some instances it had been found necessary to use two glasses of different colours superimposed. Thus a certain green was obtained by means of two tints of orange combined with one of violet. The glasses were cemented together with Canada balsam, the two varnished faces being in contact; when only a single coloured glass is used the varnish must be protected by a plain glass. The glasses were mounted in a brass frame so as to permit of their being placed in front of the lens. The frame of the dark slide of the camera was furnished with a strong adapter, two millimètres in front of the sensitive glass, to receive another glass which was transparent, the object of which was to prevent evaporation from the sensitive plate. The collodion used was a bromised sample containing either eosine, coralline, or aurine. This improved the sensibility by reducing the refrangibility of the rays. Chlorophyl did not give such good results; for, according to the time when the ivy leaves from which it was obtained were gathered, they contained more or less of a kind of gummy substance which injured the sensibility. Chlorophyl obtained from spinach did not give good results. At the close of the exposition several negatives obtained by the agency of the glasses which had been exhibited were submitted for inspection.

The following remarks on the reproduction of engravings are supplementary to the article on this subject by Cte. Ludovico de Courten, given in our last number, and are by the same author:—Referring to the intensification of the negatives by means of iodides, he says that a difficulty here supervenes, for after a time the intensity diminishes, the greenish-black colour of the negative viewed by transmitted light becoming first yellow and then rapidly diminishing in force. However, if the negative be only intended to be employed in the production of a limited number of proofs, the iodide method is recommended on account of the superior beauty of the results. It would be observed that, occasionally, the clear lines in the negative, which represent the blacks of the engravings, are sometimes slightly veiled or fogged by a thin deposit of silver. But this is occasioned by the nature of the ink with which the engraving itself is printed—a fatty ink which gives lines having a glazed appearance, rather than an ink giving a dead black surface, being frequently employed, the former resulting in greater softness and a better effect.

It is evident, however, that a good photographic copy will give faithfully all the different effects, each according to its value. It is, therefore, necessary to commence by subjecting to a careful examination the engraving to be copied, lest a negative be rejected as faulty which in reality may be excellent. The development must not be pushed too far, as it must be borne in mind that a really fine copy of an engraving is only obtainable from a negative which has been intensified after fixing; but, as the operations have a decided tendency to make the collodion loose and rotten, the plate should be carefully prepared with a substratum composed of—

Water	1,000 c. centimètres.
Albumen	3 „

Filter, and flow freely over the plate. By adopting this precaution the collodion film will sustain no damage, and will adhere closely to the plate during the whole treatment. For this reason a substratum must be considered indispensable.

ODIC FORCE OR WHAT?

"Do you believe in ghosts, Mr. D.?" This question was put by a lady friend of mine whom I should have judged utterly incapable of entertaining ghostly ideas of any kind; for a more material, unimaginative soul I never met. Matter of fact, honest and open as the day, and kindly withal were her characteristics, so that such a query put in a serious manner considerably surprised me. "Ghosts!" I repeated; "I cannot say that I do believe in them, otherwise than existing in the imagination of the seer." "Because," she continued, "since I last saw you a most curious occurrence has taken place, and perhaps you can help me to some explanation; as it is I am very much puzzled." I expressed a wish to hear about it, and she at once told me the following:—

"You are aware that occasionally, when busy in the season, I am accustomed to assist in spotting-out the mounted proofs. Last May our principal young lady in this department had been away ill for a few days, and I, in the meantime, continued her work. Thus engaged one night till nearly eleven o'clock with a pile of mounted cards on the table in front of me, from which, from time to time, I took one, touched out the imperfections, and placed aside, I at last came to a portrait I did not recognise as our work. It was the presentment of a middle-aged lady with grey hair, neatly curled on each side of her face, a rather heavy chin indicating determination of character—altogether a pleasant, striking portrait. Who was it? I could not call to mind any one of our sitters at all like it. I did the requisite touching and laid it with the others, straining my memory as to the person. Another one of the same, another—six in all. On taking up the last I noticed a dark mark extending from the temple over the eye completely ruining the picture. Had I overlooked it in the others? I found I had; it was on all. I thought it strange that I should not have noticed it till the very last; but as I was getting sleepy, I accounted for it in that way. 'How careless of the printer,' I said to myself, 'to go on printing without getting the imperfection remedied; I must show them to him tomorrow and have it altered.' I brought my labours to a close for the night, locked up, and went to bed; but I could not sleep—a most unusual thing for me, who generally sleeps so well. There I lay tossing about, every sound seeming to startle me, listening and fidgeting, thinking of first one thing, then another, hoping my husband had met with no accident on his journey north, but that he would return with a good book full of orders. Then this spoiled print came into my mind. I speculated as to who it was, and it struck me then as very singular I had not noticed the mark until the very last, conspicuous as it was. After a time I fell asleep, and dreamed a dream in which the original of the portrait seemed soliciting my help from some danger or other. Vainly endeavouring to make me understand what it was, the scene changed. In a large, handsomely-furnished room the same lady appeared in conversation with two men, one of whom snatched something from her hand and gave it to his companion. There was a struggle, in which I heard my name frequently called; but, as so often happens in dreams, I felt unable to stir, though I tried my utmost. I cried 'Help! help!' and in the midst of my excitement woke to find the sun shining into my window, and as genial and bright a May morning as we often see. I hurriedly got out of bed and dressed, unrefreshed by my night's sleep, proposing to myself a dose of medicine. The business of the day commenced; one thing or another prevented me continuing the employment of touching-out until the afternoon, when I thought of the spoiled prints and the directions to be given to the printer concerning them. I therefore went to fetch them down stairs for this purpose; but nowhere could I find them. No one had been into the room since I was there myself (to the best of my belief), after locking up the previous night, and the key was in my pocket. Where could they be? I came down, made inquiries, but, as I expected, no one had seen them or had been into my room. The mystery was that no one could recollect anyone being taken in any way resembling my description of the missing cards. The printer said he had no portraits at all like it at press for a week or more, and none then that would exactly correspond with my description. Puzzled and dissatisfied, I was compelled for the time being to let the matter drop. It was somewhat late that day before I could commence the spotting-out. Seated as before, a stack of photographs stood in front of me, from which, from time to time, I took one, touched, and laid aside, when, to my intense surprise, I found the six portraits that had given me so much trouble! Four times had I thoroughly looked through those pictures without seeing them, and yet here they were! I at once gathered them together and went downstairs to say I had found them, and to make inquiries. As it happened, all the young people had left for the day; so placing the cards in a drawer, kept for the purpose of holding prints requiring alterations, I returned to my work. How I could during so minute a search have managed to overlook them was unaccountable. One might have been missed, but, six! it was a mystery. I was making the table tidy before leaving for the night, when I observed a card on the ground, which I picked up—one of the same lady. 'Dear me!' I exclaimed, 'I must be getting very careless; I'm sure I thought I took all the six down stairs.' I laid it down, turned out the gas, and went to bed. My dressing-table faces the foot of the bed, a gas bracket projects from the wall at the side of the mirror, a few china toilet trays and bottles, with a small hand-mirror, occupies the table, with a pincushion in front, which I had occasion to move, when I found another of these card portraits beneath it. It was one of the same lady that had so perplexed me. 'Someone is playing me an abominable trick, I see now. I will put an end to this nonsense tomorrow,' I ejaculated. I undressed and got into bed, hoping for a better night's repose than I had on the previous one, leaving the gas burning with a small flame, but sufficient to see all over the room. I may here say that, having once found a thief secreted in a wardrobe, I take the precaution of looking wherever anyone might be hidden, and then lock my bedroom door. This routine I go through every night before getting into bed; then I feel I can sleep in safety. I was more particular than usual this night, as I felt nervous and headachey. I might have been, perhaps, an hour in bed when I woke up—not a gradual return to wakefulness, but suddenly I was wide awake, with all my faculties about me. 'What was that noise? Surely I heard something!' I looked in the direction from whence the sound seemed to proceed, and there, sure enough, was somebody—a female—partly kneeling, partly lying on the floor, seeming as if trying to raise herself by the help of the chair. Thus much I saw by reflection in the toilet glass; the rest was hidden by the end of the bed. Vexation and astonishment at anyone daring to enter my bedroom without permission were my first feelings, and I spoke in anything but dulcet tones to the intruder, who took no notice, but still seemed struggling to rise. I asked again—'Who are you?' Still no answer. I began to feel frightened at this persistent speechlessness, and raised myself up in bed to get a better view of the intruder. In doing so I got a glimpse of the face, which, to my great horror, was that of the lady in the portrait which had so puzzled me. A crimson streak supplied the place of the mark on the temple and forehead in the portrait, and, with the exception of a little rill of blood trickling from the nostrils and over the chin and mouth, the face was deadly pale. To say I was alarmed is not the word for it; I was perfectly horror-stricken, as the poor, pale face looked pleadingly towards me. I rubbed my eyes to make sure I was not labouring under a delusion; I pinched myself; I was as wide awake as ever I was in my life. In the impulse of the moment I jumped out of bed and violently rang my bell, the rope of which, after the bell had sounded a tremendous peal, came down in my hands. I could not call; my tongue stuck to the roof of my mouth. That an attempted murder had taken place in my house occurred to me, and the victim had escaped to my room; but who and how—that was to me the mystery. However, these thoughts seemed to be jumbled in my mind and indefinite. It dawned on me at last to give assistance to whoever it might be (you must bear in mind all this took place in less time than it takes to tell you about it). I moved towards the chair, which was some distance from the bell pull, with this intention, but was interrupted by my servant knocking at the door. I told her to come in. As she did not, but continued knocking, I went to ascertain the reason, and found the door fastened, locked, and bolted safely on the inside as I always left it. I quickly undid it, and the girl, seeing my scared look and hearing my frightened tones, asked me what was the matter. I pointed to the woman; but, lo! she had gone. I looked under the bed, in the cupboards, everywhere, but no trace could I find—no blood, no anything! My dressing-gown hung over the chair back, undisturbed, just as I had put it—nothing to indicate that anything unusual had taken place. I was bewildered. Sleep by myself I dare not; so telling my girl I felt ill and should like her to sleep with me the rest of the night, in case I required anything, once more got into bed; and, what with the excitement and fright, fell into a troubled slumber. Nothing further occurred that night, and in the morning I made another thorough search, but found nothing. Ill as I felt I could not lie in bed; but in the excitement of business tried to reassure myself I had been dreaming. Nervous and unsettled I felt all that morning I can tell you—especially when, in order to give the cards to the printer, I went to the drawer where I had placed them the previous evening, but found them gone! Nobody, as before, knew anything about it. No cards were to be found. Was I mad? This thought occurred to me. If not, I was ill, so sent for my medical man. I felt I could not tell him what had

occurred; but he divined something had upset me, and asked if I had had any trouble to cause the symptoms. I said that I had. He advised me to rest, and did not push his inquiries, but suggested that my brain was too much taxed and my stomach a little deranged. He promised to send some medicine, and left. In the course of the afternoon, as I sat at my workroom window, a carriage drove up to the door, a lady got out, and after a word or two with the coachman came in, requiring her portrait to be taken. She remained about half-an-hour, reseated herself in the carriage with her back towards me and drove off. Now this was such an everyday occurrence I should not have noticed it particularly, but that I saw two disreputable-looking men soliciting alms at the window of the carriage, which they rapidly followed as it went away. Our manager soon afterwards came to see me bringing a negative of the lady just taken to be retouched, as she particularly wished to have one that same evening, if only a rough proof. I took it from him and nearly dropped it in my agitation when I saw it was the negative, to all appearance, from which the lost prints had been taken *minus* the mark on the forehead and temple, and the resemblance of the intruder of the previous night. I inquired if the lady had been taken before. The manager replied in the negative; he had never seen her previously. She told him she had just returned after a long residence in India, and was very chatty and pleasant. I directed him to get a proof off, and take it himself to the lady, at the same time to call at the police station on the way and deliver a letter for me. I requested him to be sure and see the lady herself and take her order. Our manager was surprised, as well he might, at such unusual directions, but was quite willing to oblige me. He afterwards told me I seemed so agitated and ill he thought there was something on foot, of which I had discovered the clue, connected with the lady, and became as anxious as I was to see the end of the matter. The proof was ready in the evening, and was taken, also my letter to the police station. I must now relate what occurred, as reported by our manager:—'I went, as you directed, to the station, and an officer was at once sent with me to wait outside the house whilst I delivered my proof. I could not make any one hear, although the hall-door was open, so went into the lobby, which was shut off from the rest of the house by folding baize doors, to wait. Almost immediately I fancied I heard faint screams for help—so faint I could but just hear them. However, I pushed the baize door open and listened. I was sure then I heard some one call, and without hesitation went in the direction from which the sound seemed to proceed, which appeared to be a room on the left-hand side of the corridor. As the door was slightly ajar I looked in, and saw two ill-looking men busily engaged ransacking an *escretoire.* I did not wait to make other observation, but at once fetched the policeman, and we entered the room together. The men made a desperate attempt to escape, dealing us some nasty blows before we overpowered them. The lady for whom I had brought the photograph lay partly under the table and partly on the rug in an insensible condition, with blood trickling from a cut on her forehead and temple, and would, in all probability, have died had we not fortunately come to her assistance.'—The lady eventually recovered, although the shock to her system had been very severe, but the scar still remains. She always attributes her preservation to a special interference of Providence. Her account of the matter was as follows:—As she was leaving my house, after having been photographed, two men asked for relief, giving such a piteous account of their condition that she told them to call at her house and she would assist them. When they called the housekeeper and servants were engaged in moving a heavy package below that had been just delivered by the railway people. The men, without ceremony, pushed their way into her room and straightway demanded her money; she was about to summon assistance when she received several blows on the head rendering her insensible. The rest the reader has heard. I need not say this lady is now one of my dearest friends. Yesterday, on looking over an old box, a portrait was discovered taken some years before in Calcutta, and which, strange to say, was the precise counterpart of the portraits that had given me so much anxiety. A scratch on the surface was the dark mark alluded to. This box had never been unfastened before since her return to England. Now, friend D——, what do you make of it? Can you help me to solve the mystery?"

I frankly confessed it was beyond my powers, and agreed with her it must have been a special intervention of Providence. E. D.

SCIENTIFIC JOTTINGS.

The hopes which were entertained when the advent of the De la Bastie process of tempering glass was first bruited about, that it would be of great use to photographers, seem to have been entirely disappointed, and from causes inherent in the system itself. For lenses the refractive power of the glass is rendered irregular, and, consequently, they are spoiled when subjected to the operation; and for negative glass the fact that it cannot be cut, taken in combination with the utter ruin that would happen when a breakage did occur, accounts for the entire indifference with which the subject is now regarded. We do not, however, see why a process should not be discovered by which the tempering should affect the whole mass of the glass through and through; most of the chief disadvantages of De la Bastie's process would then be avoided. There is already a rumour abroad that a German (Herr Pieper) has discovered and patented a method of tempering of an entirely novel character. It will be remembered that the first process we have named is carried out by the agency of baths of heated oil. The new method, however, does away with all this mess and the necessity for cleansing the article afterwards, the plan consisting simply of exposing the articles while red-hot to an atmosphere of superheated steam. They are said to be both tempered and hardened by the treatment. We believe that the German glass-makers have thought well enough of the new patent to have given £15,000 to Herr Pieper for his patent rights.

Even with tempered glass or Berlin porcelain breakages will happen; and our readers may be glad to learn a method of enabling them to utilise a cracked porcelain evaporating dish. A mixture of chalk and raw linseed oil is firmly pressed over the crack for a little beyond its entire length, in a layer about an eighth of an inch thick and a little less in width. The utensils must then be put by for some weeks, when the cement becomes quite firm and sufficiently hard to resist the nail. The action of steam upon them for a considerable length of time is imperceptible. Of course we could not recommend a dish so treated for boiling a silver bath, for instance.

The price of metallic silver is still a subject of grave importance. Photographers who grumble because while the metal has come down twenty-five per cent. the salt has dropped only about two and a-half per cent. are not so badly off as the Indian official. His salary, poor man! being payable in a silver currency, he finds practically reduced to about three-fourths of what it was a short time ago before the fall in price set in. The commission which recently sat to investigate the cause and its remedy, if one were possible, sent in their report some few weeks since, and they gave no hope whatever of an upward reaction. The chief causes they found were the increased supply available in various parts of the world, and the conversion of the German coinage. Silver is a very widely-spread metal; it is even found to a large extent in Australian gold, the amount varying from five to forty per cent. It is extracted in the mints of Sydney and Melbourne by the help of chlorine, which is forced through the molten metal, chloride of silver being formed and rising to the surface combined with a little gold, the contents of the crucible having previously been covered with borax.

It is not generally known that chloride of silver combines with gaseous ammonia to form definite chemical compounds. No doubt many peculiarities of "ammonia fuming" could be elucidated if these chemical reactions were thoroughly well worked out. A communication on the subject was made at a meeting of the German Chemical Society, by A. Horstmann, confirming results previously announced by F. Isambert regarding some properties of these compounds. They may be summarised by saying that he found for every degree of temperature a certain pressure at which the separated bodies do not combine and the combination ceases to be decomposed. From this it will be evident that the temperature and the height of the barometer must have a considerable influence with regard to the amount of free ammonia when the paper has been fumed. Herr Horstmann also gave the formulæ for two compounds of ammonia and chloride of silver, viz., $Ag\,Cl.\,3\,N\,H_3$ and $2\,Ag\,Cl.\,3\,N\,H_3$.

We have alluded to the widespread existence of silver, but on the authority of Ad. Chatin *(Compt. Rendu)*, we are able to state that iodine is one of the most widely disseminated in the whole range of the elements. M. Chatin writes proving the presence of traces of it in most bodies on the earth and *in the atmosphere*, and he gives in the publication named a description of methods he uses and precautions to be taken in testing for minute quantities of iodine. Is it possible that some of the vagaries of collodion plates might be traced to its presence, as stated, in the atmosphere? The sources of this element, as our readers are aware, are the ashes of various species of *sea*weed, and also the mother-liquors from the evaporation of some mineral waters; but H. Zenger *(Arch. Pharm.)* has pointed out a hitherto neglected source of it, viz., the fresh water *Alga, cladophera glomerata.* He gives a determination of the amount found in various experiments. Another plant also yielded it, but he does not state the proportion of the iodine to the rest of the constituents of the plant *Lemna minor.*

A very important adjunct to the photographer's dark room is his supply of litmus-paper. A small quantity lasts a long while, so he generally purchases it ready made. Nevertheless, as it is always desirable to be acquainted with the best method of preparing one's own chemical requisites, we make note of a communication by V. Warsha, published at length in *Deut. Chem. Ges.* All litmus, it is well known, contains a colouring matter soluble in alcohol, which, if not extracted, masks to a great extent the delicacy of reaction which litmus should show. M. Warsha recommends that the litmus first be exhausted by common alcohol, and the mass then treated with distilled water for twenty-four hours, evaporated on a water-bath, and the residue treated with absolute alcohol containing acetic acid. When this is again evaporated a brown powder is left, which, if passed through the same series of processes, gives the pure colouring matter of the litmus, which is sensitive to a most remarkable extent.

Some very interesting investigations relative to the production of cold by the admixture of acids with snow have been lately made by G. Witz, L. Pfaundler, and others. Contrary to what one might have expected, the mixture of equal parts of snow and strong sulphuric acid, or rather more snow—1·097 parts exactly—brought about a reduction of temperature to 32° below zero, the well-known behaviour of sulphuric acid and water, viz., the production of great *heat*, being thus reversed. Hydrochloric acid lowered the temperature still more—to the extent of a degree or two.

Some of the finest astronomical photographs ever produced have issued from American hands, the atmosphere there, perhaps, admitting a larger number of occasions suitable for the taking of celestial photographs. We shall, therefore, look forward with eagerness to the time when the great Californian telescope will be constructed. It will be remembered that a wealthy San Francisco gentleman, some time ago, left £200,000 for the construction of a gigantic telescope. M. Leverrier has lately been consulted with regard to it, and he concurs in the opinion that it will not be advisable to make the object-glass of larger diameter than one metre. The validity of the donation has been the subject of a lawsuit, which has ended in favour of the astronomers. At a former meeting of the Academy of Sciences, Paris, photographs of the sun twenty-two centimetres in diameter were presented, and it was announced that a still larger series from a telescope of thirty-six centimetres' aperture would be seen in a short time. How much these would be eclipsed by a picture from a telescope of 100 centimetres we need scarcely dwell upon.

Contemporary Press.

THE PORCELAIN PICTURE.

[Photographic Times.]

There are two ways of making this beautiful print—the one with the copying camera, and the other with the porcelain printing-frame. The copying camera, therefore, first claims our attention.

Copying Camera.—You can obtain very excellent copying cameras, ready in every respect, from the stock-dealers, or you can easily make one yourself. In the first place, ascertain the focal length of the lens you intend to use for this purpose; this you do approximatively by measuring the distance between its burning-point and the middle of the brass tube that contains the combinations of glasses that make the lens. We will suppose this distance to be eight inches, and, furthermore, that you have a camera to which the lens is already attached. Construct a box of about thirty-two inches in length, namely, with a bottom and two sides, of such dimensions as to allow your camera to slide accurately on the bottom and in contact with the sides and the upper lid, which latter is only twenty inches in length; this lid covers the top of the box under which the lens slides, and is adjusted on hinges. The end of this box in front of the lens is so arranged as to receive a set of shields or plate-holders from the four-fourth size downwards to the one-sixth plate, or to whatever size you require; each shield is fixed in its place by means of metallic springs or rotating buttons, and the negative is fixed in the shield in a similar manner. If you have a convenient and unobstructed view on the north side of your gallery you can place this compound box so that the negative receives its light from the north; in such a case the box can be supported on the window-sill or on a table in this position. But, as a general rule, I think it the best plan to receive the light from the skylight, and then, by means of a side reflector, to transmit it in a horizontal direction through the negative and the lens. In this way you can get the softest and most uniform illumination. The reflector, to produce the result in question, is fixed in front of the negative on hinges at the bottom of the box, and, consequently, opens downwards. It consists of a plate of glass in a frame like a school slate. On the under-side of the glass a quantity of gypsum, mixed into a cream with water, is poured and not allowed to concrete; when dry it may be backed with a piece of strong pasteboard or thin wood. When the reflector is lowered on its hinges, so as to be inclined at an angle of forty-five degrees with the surface of the negative, it is evident that the light from the skylight will be reflected perpendicularly upon the negative, and, furthermore, it will be white and homogeneous. The negative to be copied on the porcelain plate is fixed in the shield wrong side up, and with the collodion looking to the lens. I must remark here that the negative which is suited for such sort of work must be very thin, transparent, and yet full of detail; it must be much thinner in the opaque parts than an ordinary negative for paper prints; and it is well not even to varnish the negative, because a layer of varnish is apt to detract from the transparency of the film or to leave small particles of opaque matter on its surface.

Most generally the picture is required to be of the same size as that on the negative; therefore, slide the camera under the lid until the middle of the lens is about sixteen inches from the negative, and focus the negative on the ground glass by moving the bellows part of the camera. If the picture on the ground glass is now of the same size as that on the negative, no further adjustment is needed; but if it be larger, then draw the whole camera (not the bellows part) a little back and focus and measure again. If, on the contrary, the picture on the ground glass were larger than that on the negative you must slide the camera forward to the front. As soon as the exact position is once found where the two pictures are of the same size the camera is fixed or clamped in this position, and a mark is made by means of which the camera can again be placed in the same position if it should be removed for other purposes.

The porcelain plates are prepared for the reception of the collodion precisely in the same manner as common glass—that is, the edges are first filed or ground off, and the plates are then carefully washed and coated with dilute albumen.

It is advisable to use a rather new collodion, carefully filtered, and, perhaps, less consistent than negative collodion; five grains of pyroxyline to the ounce will be sufficient, and the bromo-iodiser may consist of three and a-half grains of iodide of ammonium to two and a-half grains of bromide of cadmium to half-an-ounce of ether and half-an-ounce of alcohol. Your ether must be concentrated and free from acidity, otherwise the collodion soon becomes red; and the collodion must be concentrated too, otherwise the collodion will form a reticulated film as it dries. (Much of the alcohol which is sold nowadays as being ninety-five per cent. strong seldom exceeds eighty-five per cent.; and the ether is frequently both dilute and acid. Get your stock of these articles from responsible houses, and not from the drug stores, where most generally you obtain them of the quality about which I complain. Furthermore: learn to test them yourself.)

The same exposure is required for a good porcelain picture as for a good negative; and in both cases an over-exposure is preferable to an under-exposure, because you can control the development in the first place, but cannot bring out the picture by any sort of forcing in the second case.

You will do well to have two baths for sensitising the plates—one of the usual strength, and the other, into which the plate is dipped when sensitised, containing not more than ten grains of nitrate of silver to the ounce of water; and I would recommend you also to allow the plate to drain completely before you proceed to the development. You can use the iron developer, the nitro-gelatine, or the ordinary, but in both cases it must be filtered and recently prepared. Much depends in this process in having all your solutions perfectly clean, pure, and of the best quality. The picture comes out gradually when the developer is poured on; and the development is stopped by washing, when the intensity of the shades is a little beyond what you require in the finished picture. It unfortunately happens, somewhat frequently, that the whites of the picture become stained with silver, even in places where the light has not acted. The only remedy appears to be extreme care in cleanliness and manipulation. Wash thoroughly, and then proceed and fix the picture, unless there happen to be stains of silver on the portrait itself. In this case it is better and easier to make a new picture than to attempt to remove the stains; if the latter appear only on the background, and especially at some distance from the picture, you can easily remove them after fixation. Use *fresh* hyposulphite solution for each print. Wash thoroughly after the plate is fixed, and then examine it in broad daylight. Now is the time to remove any little stain on the white background that mars the beauty of the picture. For this purpose mix in a small vial one drachm of nitric acid and seven drachms of water; place quite conveniently a beaker full of water ready to be poured on the plate the moment it is needed. Now pour some of the acid solution on the stain, and incline the plate so that the fluid may fall from the portrait and not towards it; if by accident the acid run towards the picture and gives signs of encroaching upon it, immediately wash it off and begin again. By this proceeding all stains can be thoroughly removed, after which the plate is again carefully washed.

Toning of the Porcelain Picture.—In its present condition the porcelain print is not agreeable in its tone, being of an ill-defined, greyish hue; but this is easily remedied. Dissolve fifteen grains of chloride of gold in two ounces of water, and of this solution take one drachm to two ounces of water for present use. Pour this solution over the picture until the tone is just uniformly changed into one of a slightly-rosy hue, but no more. Wash again. Keep in stock a saturated solution of bichloride of mercury, and for present use take one drachm of the same and mix it with one ounce of water. Pour this solution over the gold tone, which will soon change to a bright purple-black, giving much brilliancy to the picture. This operation is very critical, and you have to guard against proceeding too far; for then the tone recedes, and then becomes gradually whiter and whiter. It is absolutely necessary to stop before the retrograde motion sets in. The tone once gained the plate must be washed immediately in order to remove every trace of mercury. The picture now will be handsome and brilliant, and of a warm black tone, which mercury alone cannot produce; it partakes of the tone which is produced when chloride of gold is mixed with a solution of bichloride of mercury. Dry the picture, and varnish it with a colourless, transparent varnish.

If the print is to have a vignette form you must introduce the proper blind within the camera and between the lens and the porcelain plate to produce the vignette. These vignette forms are easily made out of black paper, being first cut of an oval or elliptical shape, and then the edges are cut stellated, so as to soften the gradation of the picture towards the white background.

The porcelain picture is about the handsomest of all photographs, and especially when artistically coloured does it become a work of art. Some porcelain pictures, prepared in the gallery of Mr. Kurtz, some years ago, presented some of the finest specimens of workmanship in stippling that the artist could attain to; they were real gems. Colouring on porcelain is an art of itself, and requires not only a special mode of preparing the film for the reception of the colours, but a special study in laying on the colours; and there is no work so well adapted for giving the required instruction to photographers as the excellent little manual on photographic colouring by Mr. Ayres.

Printing porcelain pictures by contact I shall discuss in my next communication. AN ADEPT.

Meetings of Societies.

THE PHOTOGRAPHIC SECTION OF THE AMERICAN INSTITUTE.

THE last meeting for the season was held on the 6th June,—Mr. H. J. Newton, President, in the chair. After some preliminary business had been transacted,

The PRESIDENT exhibited a number of prints from emulsion plates, the first of which was a view of the new post-office, from a negative made by Mr. E. Bierstadt, and printed by the Albertype process. He (the President) said that at a previous meeting he partially promised to show some further results in portraiture with emulsion. At that time his intention was to go to some of our well-known galleries, and to make negatives with such skylights as are ordinarily used. His time, however, had been so much occupied with other matters that he was unable to do so. He was able, nevertheless, to show sufficient to convince them that his emulsion could be worked successfully in the gallery for portraits, producing finer results, with more uniformity and certainty, than by the old process. The development was more under control, and when one had had a little experience, and was properly fitted up for working emulsion, as many negatives could be produced in a given time as with the bath. He wished it to be understood that he presented these specimens more as a prophecy of the future of emulsion than as a perfected process. As he remarked on a former occasion, the process is in its infancy. There had never been a photographic process perfected by one person. One individual, in following out the experiments and suggestions of another, would think of methods of improvement in one direction, another would make some important change for the better in a different branch of the process, and so on, gradually improving until the utmost capacity of the process was developed. That was the way the nitrate bath system had been brought to its present state of perfection. The emulsion with which those negatives were made was as sensitive as the ordinary bath-plate, and, he claimed, would produce a better negative with the same exposure. He had good reasons for believing the sensitiveness could be still further increased by at least one-third, perhaps one-half. In the last year the keeping qualities of the emulsion had been thoroughly tested. He had there a negative and a print from it, both of which were made that morning. The emulsion with which the negative was made was compounded on the 1st of March, 1875; it was, therefore, fifteen months and six days old, and worked as clear and brilliant as ever. He had discarded the use of a chloride to take up the excess of silver, and adopted hydrochloric acid. He had some prepared in that way about a month old, and it worked as well now as when first made. He had prepared some four or five different lots in that way, and the results were very uniform. As hydrochloric acid was not of uniform strength, a good way to ascertain how much of a given sample would be required was to dissolve ten grains of silver in half-an-ounce of water, and with a dropping-tube drop in the acid until the chloride of silver ceased to form. In that way they could learn how much of that particular acid was necessary to take up the excess of silver in a given quantity of emulsion. They could determine if any free silver remained by pouring a small quantity of emulsion on a plate of glass, exposing a few seconds to the light, and then pouring on to it a small amount of the ordinary iron developer; if any free silver remained the emulsion would turn black, and more acid should be added. If there should be a considerable amount of acid it would do no harm —at least he had not discovered that it did in his experiments. In developing a portrait negative he first brought out the faint image with the plain pyro. in water, from three to six grains to the ounce, then the alkali was added, and the details all brought out; but no attempt was made to obtain sufficient strength with the developer. When the details were well out he washed off, and flowed the plate with an acid solution to neutralise the ammonia; citric or tartaric acid would answer. The development was then completed with pyro. and tannin and silver, as before given, or with iron. At another time he would give the formula for an iron developer. He had used iron for many years for developing dry plates, as was well known by those who read the photographic journals. Some six years ago the *Philadelphia Photographer* was illustrated with prints from his dry plates which were developed with iron, and the formula was given at that time. At the last meeting the question of tannin as a developer for dry plates was raised, which to a certain extent involved the question of priority in its use as a developer. He had never made any claim to originating the idea of its use. The first time he ever heard of it as such was many years ago. Being one day in the office of Mr. Charles Wager Hull—the veteran dry-plate worker, and one of the most successful in the country—he showed him (the President) the first dry-plate negative ever made in the United States. He stated to him that it was developed entirely with tannin, no other developer being used except tannin and silver. That was the first time he ever heard of its use for that purpose. It may have been used before that, but never to his knowledge. Mr. H. T. Anthony had used it in very small quantities in combination with iron in developing the ordinary bath negatives. Who first used it in combination with pyrogallic acid he was unable to say; but for many years he had used it, and those who had read in the photographic journals his process for developing dry plates with iron would find that he used the pyro. and tannin alternately with the iron to strengthen the negatives.

Mr. O. G. MASON (Secretary) said: These pictures, gentlemen, take us—especially the older workers of a quarter of a century—entirely out of the field of light-painting with which we were acquainted at first. We have even discarded the nitrate of silver bath. It does not appear at all in this process. But in this picture of the post-office the President remarked that the fine quality of the work was due to emulsion, but I am convinced that there was some one behind the camera used who knew how to work it. This certainly is the most successful carbon picture that I have seen in this country, and I believe it to be the finest picture of its kind, all things considered, I have ever seen. In regard to the emulsion, I would say that I have seen it worked within the last two weeks, and, although I expected to be surprised, yet I did not think I would be so much surprised. Although the President says he considers it but a promise of what can be done, yet from its present appearance I would say that we are very near a very material change in our methods of working—not only out of doors, but in-doors.

Mr. John Gurney exhibited several portrait prints from emulsion plates. The pictures were finished in glaze and covered with oval glass. They were coloured by Mr. Gurney's process, and presented a very fine appearance. The price of these pictures, imperial card size, was stated to be fifteen dollars each.

Dr. ADOLPHE OTT, having exhibited a large number of prints made by Messrs. Aubel and Kaiser, at Cologne, said:—Most of the photographic processes of the present day are based on the application of a mixture of gelatine and bichromate of potash. Pure chromic acid, as well as its compounds, are not sensitive to the light; but in presence of an organic substance capable of parting with oxygen—such as paper, woody fibre, gelatine, &c.—the light immediately acts thereon. Although this fact was discovered in the same year from which we date the for-ever-memorable discovery of Daguerre, it was not applied to any practical use until about twelve years later, when, in the year 1852, Talbot, to whom we owe the first durable photographs on paper, worked out a problem that Wedgwood had vainly tried to solve, and on which was based the first heliographic (light-engraving) process on the reaction of chromic salts on gelatine. Talbot covered a steel plate with bichromated gelatine, left it to dry in a dark room; then placed it under a positive, and submitted it to the sunlight. The opaque parts of the glass picture, preventing the light from acting upon the gelatine, left the same in its normal soluble condition, while all the transparent parts were rendered insoluble. The plate was then subjected to a bath of warm water, when all the parts unaffected by light were washed away, and the other parts remained. In this manner Talbot obtained a relief picture, which, on being treated with acid, produced an engraving on steel capable of giving a print upon removing the gelatine. In 1854 Paul Pretsch, an Austrian, invented his photogalvanographic process, by exposing the gelatine relief to the action of a galvanic current in a bath of sulphate of copper. This electrotype was taken in the same way as from a wood engraving, being elevated, when the original was the reverse. Pretsch employed a mixture of gelatine, bichromate of potash, and iodide of silver, the latter being added to produce a grainy structure on the plate, and, after being washed with water, it was finally treated with alcohol and an astringent liquid. This process was adopted and carried into practical use by the Photogalvanoplastic Company, of London, from which I have seen exceedingly fine reproductions of the size of 18 × 25 inches. Why this company was not successful I do not know; probably it was because retouching was then unknown, and also owing to the fact that the chemicals and apparatus of the period left much to be desired. Among the many investigators who have developed this photogalvanographic process, the names of Garnier, Placet, and Baldus in Paris, Avet in Italy, and Mariot in Vienna may be mentioned; but I would say that it is by no means practicable for producing anything else but line engravings, such as maps, pen-and-ink drawings, &c., for which purpose, however, it is of great value. Instead of taking directly an electrotype from the gelatine relief, a coat in plaster of Paris, wax, gutta-percha, or even sulphur can be taken, and from such matrices casts in type-metal can be produced. It is probable that the Photo-Engraving Company of this city uses this or a similar process. I have here a number of engravings by Messrs. Aubel and Kaiser, of Cologne, printed from plates of type-metal, which can be placed among ordinary

types and multiplied by the printing-press. Scammoni, in St. Petersburgh, succeeded as early as 1861 in obtaining electrotypes directly from photographic negatives. The picture is intensified with pyrogallic acid, silver, and mercury solutions until a perfect relief is obtained. This is then covered over with a varnish and dusted with graphite, whereupon it is ready for the electroplater. Most of us, I suppose, have seen such helio-engravings of Scammoni. They were on exhibition at Paris in 1867, and some specimens of it are appended to Professor Vogel's popular *Treatise on the Chemical Effects of Light* (Liepsic, 1876). I have mentioned in a few words in what manner a photographic impression is obtained in gelatine. To describe all the particulars of the process would require a whole evening, and then no one who had not prepared a number of plates would be able to make immediate use of such a description, however detailed it might be. As all of us know, it was Albert, of Munich, who first succeeded in printing from a gelatine surface in the same manner as lithographs are printed. These Albertypes (as they are called) give a picture with all the shadings; and, in fact, so high is the perfection this art has reached that the work cannot often be distinguished from a photograph. But while Albert has only succeeded in producing prints by the hand-press, Messrs. Brannerk and Maier, in Mainz (Germany), have now made the steam-press available to this process, enabling them to obtain from one thousand to fifteen hundred prints a day, and one uniform with the other. With the hand-press it is difficult to get even one hundred prints a day, and, moreover, the most experienced person is not always able to produce uniform prints. The firm just mentioned have recently completed a large work, consisting of several hundred pictures, representing the most interesting objects of the late Art Exhibition in Frankfort. They have also reproduced a series of cartoons of celebrated masters, representations of which are now placed within the reach of almost everyone, the cost of printing being much lower than with the process employed by Albert. There can be no doubt that this latest improvement will be of immense value to both the arts and sciences, as copies of any subject can now be taken with an ease and perfection equal to ordinary photographs in every respect. Another advantage in this process consists in this—*that the plates can be set up with type*, thus enabling the publication of a photographic newspaper. The invention has thus far been secured by several large firms in Europe.

The meeting was then adjourned to the 5th September.

Correspondence.

ANOTHER NEW PHOTOMETER.—ART REPRODUCTIONS.—KOCH'S NEW CAMERA.—EXHIBITIONS.—BATH *versus* EMULSION PLATES.—LIÉBERT'S STUDIO.—SUGAR OF LIME AND AMMONIA.

THE Photographic Society of France held its monthly meeting on Friday evening last, the 4th inst.,—M. Audra, one of our most sucessful experimentalists and amateur photographers, in the chair. Whether it was caused by the influence of the temperature or not, the meeting was poorly attended; in fact, the excessive heat prevalent during the past month is sufficient excuse for any amount of idleness, even in the most enthusiastic.

M. Schülte presented a new photometer of his invention. Unhappily he has made a mistake in his reasoning. He has invented an optical instrument, and not an instrument capable of giving an appreciation of the photogenic power of the light at a given moment. This instrument is very well made, and, if it could perform what is required of it, it would have a great success among the photographic community in general, and especially among those who make landscape photography their principal object. In outward appearance it resembles the common focussing lens, at the bottom of which a disc has been soldered, having a small hole about the size of a pea near one of its edges. A revolving ring bearing a ground glass is attached to the bottom, in such a manner as to turn easily and bring before the small hole a number of figures (from one to twenty printed upon a piece of transparent paper). No. 1 is printed upon a single sheet; No. 2 is doubled; No. 3 tripled; and so on to No. 20. The idea of the author can now be clearly seen. He says:—"Look through the instrument, taking for *point de mire* the object to be produced; turn the apparatus until the highest number becomes barely visible. Supposing it to be No. 12, if the preceding day No. 14 could be seen, and an exposure of ten seconds gave a good negative, it is to be presumed that a little more exposure is necessary, and that thirteen seconds would be just the time required." This reasoning appears correct to the uninitiated, and beginners generally fall into the error; in fact, if I have dwelt long upon this subject it is with the intention of being useful to many in persuading them not to lose their time in the construction of such an instrument, without taking into consideration the actinic power of light. Since the war I have seen at least fifty such instruments on which time and money were thrown away. I know not how it is in England, but here inventors rise like mushrooms, and their works last as long as the fungi. Not only do they lose their own time, but they take up other people's, and time is money.

M. Laurent, of Madrid, sent a large collection of fatty-ink proofs—reproductions of works of art in the Industrial Museum of Milan. In these progress can be noted, and honour must be awarded to M. Laurent, as well as to a few others, for endeavouring to bring Spain up to the standard of other countries. This nation—now at peace after having been a prey to great internal commotion—can give its energy not to destroy but to create. Let us hope that ere long we shall be able to alter the present general opinion, which is, that Spain is one of the most backward in the photographic art. This is not so with its contented and hard-working neighbour. Thanks to the patriotism of many, among whom stands conspicuous the honoured name of Carlos Relvas, Portugal holds a high position in the peaceful art of photography.

Single individuals or societies who construct factories find employment for many, usually realise a fortune, and not only do good to themselves but render service to their native country, for which they deserve honour and praise. But in this they have an object in view—to make money; and if they amass wealth they think themselves amply rewarded. But what is more praiseworthy than when a gentleman leaves the *nonchalance* which wealth often produces, employs his fortune for the advancement of science, and, above all, to advance the progress of the photographic art purchases patented processes in order to endow his country? Such a man must be honoured not only by the country which gave him birth but by humanity. It is a pleasing duty of the photographic journals to publish the names of such men, in order that their good actions may find imitators, and that when they leave home they may find congenial friends in every place, and a hearty reception wherever they go. I have not the honour of knowing M. Carlos Relvas personally, but I can say to the photographic community at large, if that gentleman visits them, they now know how to receive him. Such is the man.

M. Leon Vidal—the indefatigable inventor of photometers as well as of photochromy—laid before the Society a number of photometers for carbon printing. It is a very simple little instrument intended to be nailed on the printing-frame. It gives three tints, which can easily be followed by the operator without opening the instrument, as three holes are punched through the centre of the mica or other substance used in its fabrication. Paper prepared with chloride of silver is employed to judge of the actinic power of the light.

M. Koch presented a new camera for the inspection of the members. The camera is very light, and it takes up very little room. In the folding-up arrangement it resembles those made by Mr. G. Hare, of London; in fact, no new feature finds prominence in its manufacture. Nevertheless, it is a very well-constructed apparatus, and likely to render service to tourists.

I had the honour to lay before the board and distribute among the members the programme of the Edinburgh Photographic Society's exhibition, which I received for that purpose from Dr. J. Nicol. The unanimous wish expressed was that the praiseworthy efforts of the Society for the development of photographic art might meet with great success.

M. Liébert presented to the Society an apparatus by which to obtain hot water at will. A vote of thanks was given to that gentleman, and the Society broke up for the vacation.

Speaking of exhibitions, that of the Photographic Society of France had barely closed its doors when the foundations were commenced for the next great universal exhibition of 1878, which will be something wonderful if all we hear be true. The late photographic exhibition was a decided success, as I foretold in a previous communication to THE BRITISH JOURNAL OF PHOTOGRAPHY. I cannot allow this occasion to pass without speaking of the intelligent manner in which it was organised by the *Conseil d'Administration*, under the direction of M. Davanne, ably seconded by M. Koziell, the agent and secretary of the Society.

Photography as applied to science and art held a conspicuous place. *L'Academie des Sciences* lent for the public benefit all the instruments employed in the observation of the late transit of Venus, among which the photographic revolver of M. Janssen attracted the most attention. On the walls were suspended all the proofs made by the different missions sent out by France, and the public could follow these hardy

pioneers of science, as it were, step by step in their voyage round the world. The authorities of Kew Observatory sent a few specimens of the instrument made use of in connection with photography in that establishment. I can but express my deep regret that the appeal made to photographers and others on the other side of the water was so little responded to. This is the more to be regretted inasmuch as it prevents us making points of comparison between the two countries as to the progress made during the last few years. French amateurs were greatly disappointed at this abstention, for they hoped to have seen specimens of emulsion work on which their imaginations have been kept at boiling point for the past few months, by the several articles in the photographic journals, as to its "rapidity and facility of manipulation, combined with certainty of success in the field." As the results obtained in France by many of our most careful manipulators are opposed to, at least, two of the qualities which emulsions are said to possess—namely, rapidity and certainty of good results—it is not astonishing that they were on the *qui vive* to examine and judge of the work of others. The general opinion here is that a well-prepared bath plate, although requiring a longer time in preparation, is superior in rapidity, keeps better, and gives more regular results than any emulsion. To set my mind at ease, and, at the same time, to be able to give a correct report on the matter to the readers of THE BRITISH JOURNAL OF PHOTOGRAPHY, I have come to the determination to devote my holidays to paying a visit to England, to study and examine on the spot which formula is most to be recommended. I have already received several invitations from gentlemen well versed in the secrets of photographic manipulation, and should be happy to visit the studios of any of my readers who would volunteer to assist me in throwing light upon that subject.* I find that I am like a schoolboy, playing the truant with my subject—the photographic exhibition.

All the public schools and government establishments forwarded specimens of work done in their laboratories. The School of Medicine sent a magnificent study of the human brain in its different stages.

M. Aimé Girard exhibited many micrographical proofs, among which were some of the highest interest to photographers, being studies on collodion under different circumstances, such as old and new, with excess of water, bromides, &c., &c. Carbon and fatty-ink prints were in greater number than silver pictures; in fact, the great feature of, and lesson to be learnt from, this exhibition is that silver printing is rapidly going ont of fashion, and that, ere long, proofs printed by that process will be exhibited side by side with daguerreotype plates as relics of the past.

I made it a point of duty to pay a visit to the studio of M. Liébert, who, my readers may remember, paid into the hands of the Secretary of the Photographic Society of France the sum of £20 to be awarded to any person of any nationality who would divulge the secret of how to shorten the time of exposure of the model in the *atelier*. On my arrival I was received in a very affable manner by the renowned photographer, who conducted me through his magnificent establishment. The show-rooms are superb. The studio is constructed according to the most modern ideas, aided by the practical experience of this successful photographer. Semicircular backgrounds—indeed backgrounds of every description—appliances and toys of every form, surrounds the place, and give it the appearance of a museum. The sensitising and developing rooms are constructed so that the health of the operator may not be endangered by exhalations and evaporations of any kind. A magnificent billiard-room is at hand for the recreation of impatient customers obliged to wait their turn. Everything bespeaks success. Wealth has been profusely strewn around to make the establishment a palace worthy of the smiles of the "god of light" and a repository for some of the best productions of the photographic art.

M. Liébert is a man of progress, and if he has won fame, and fortune has smiled upon him, it is owing to his indefatigable perseverance. The printing department is on the top floor of the establishment. All is done in carbon, which he was one of the first to adopt. The "mixioned" paper is now made by the firm. After the proofs are printed they are lowered down into the cellar, where they are immediately developed. The organisation here is perfect: hot and cold water is in abundance. There I saw the apparatus which M. Liébert presented to the Society. It consisted of a galvanised iron cylinder two feet high, and eight inches in diameter. The interior is fitted with a series of small copper spiral tubes. A gas stove below supplies the heat; a stream of cold water runs in at the top and filters through the heated tubes. It is immediately converted into steam, which, in endeavouring to make its way out at the top, meets the cold water running down, becomes condensed, and falls out at the lower part of the apparatus quite hot. The expense of hot water is very small, no caloric being lost. A litre of boiling water can be obtained per minute, and two litres, at a temperature of 113° Fah., at a cost of twopence per 100 litres. As soon as the gas is lighted the hot water runs out, and continues to do so as long as the gas is allowed to burn. The heat of the water is under complete control. The smaller the stream running in at the top the hotter is the water which runs out at the bottom, and *vice versâ*.

* Any letters for our French correspondent can be addressed to our office, 2, York-street, Covent Garden, W.C.—EDS.

In taking leave of that gentleman I must confess that, notwithstanding the admiration which I felt for his splendid organisation and the indications of wealth by which he is surrounded, I left him carrying with me a most agreeable *souvenir* of the amiable and, at the same time, simple and dignified manner in which I was received.

One of my correspondents writes:—"The sugar of lime gives good results, but the sugar of ammonia solution which you recommended gives better; it works admirably." If peradventure any of the readers of THE BRITISH JOURNAL OF PHOTOGRAPHY desires to make a trial of this, let him take the sugar of lime solution (of which I gave the formula in one of my letters), and pour into it the carbonate of ammonia solution. A precipitate of carbonate of lime is formed, which can be removed by filtering; the clear liquid is then ready for use. It does not trouble the bath in the same manner as the sugar of lime.

3, *Place Bréda, Paris, August* 7, 1876. E. STEBBING, *Prof.*

INSTANTANEOUS POCKET CAMERAS.

To the EDITORS.

GENTLEMEN,—Knowing how often you get your readers out of a fix, be kind enough to enlighten me on the following points in your next issue:—

The high sensitiveness of dry plates at present making success possible in artistic instantaneous work, I am constructing the smallest of cameras for such subjects. The lens is the most powerful of its kind—to wit, ———'s miniature lens, one inch focus and three-quarters of an inch aperture. The camera is formed of brass tube two inches long and two inches in diameter, and in two pieces sliding over one another, in order to focus, as the lens is rigidly mounted. I dispense with the dark slide for accurate focussing considerations, and charge the camera (with a sensitive dry plate) by putting it bodily into a little dark bag.

My difficulty is this:—When the camera is charged with a plate I want you to tell me how I am to know what I have on the plate when pointed at the object to be photographed. In your volume for 1869, page 168, in *Hints on Pocket Cameras*, you mention having used a *sight* that gave a satisfactory solution of the above problem. Could you give me full working details of a *sight* for the camera I am making—that is, actual dimensions of both openings of sight, and the exact place to put it in the camera, with method of using?

A friend of mine tells me it is possible to use what he calls a "finder;" that is, a lens as small in diameter as you like (but of the same focus as the working lens), mounted in a small tube (with ground glass) on the top of the camera. Is this correct? and would this arrangement be as convenient as the *sight*, or as good practically?

Secondly: can you inform me of the best form of instantaneous shutter for such a camera as mine, the movement to be quick enough to take moving objects, and to admit of the camera being used without a stand?—I am, yours, &c., WM. WALLACE.

10, *Grove-place, Brompton. August* 8, 1876.

[The lens mentioned will work with a degree of rapidity quite sufficient to permit a view being taken on a dry plate in a mere fractional part of a second. The best method by which to expose will be to have a shutter, with a slit, made to slide in front of the sensitive plate, and which, upon being liberated by means of a trigger, will be made to pass rapidly in front of the plate, either in a horizontal or a vertical direction. The propelling power in either case must consist of a spring formed, by preference, of india-rubber. When in use the camera ought to be held in the hand by a suitable holder or handle similar to that adopted by Mr. Skaife in his "pistolgram," although it may, with advantage, be steadied by being rested upon the top of a staff. To know precisely what amount of subject will be depicted upon the plate, a "finder" must be mounted side by side with the camera. This finder may consist either of a separate camera with a ground glass, or it may assume the form of one of the view meters which have been so frequently described, and the simplest form of which is a square aperture in a frame placed one or more inches from an eyepiece consisting of a small round hole to which the eye is applied. If a separate camera be employed as the finder it may be fitted with a common non-achromatic lens,

fine definition being of far less consequence than an image the leading features of which may be easily seen. In the absence of a finder the subject may be got quite perfectly upon the sensitive plate by pointing the camera in pistol fashion, accurately to the central object in the picture.—Eds.]

DEFECTS IN GELATINE PLATES.—A gentleman residing in Dublin, who had long been annoyed with blistering and frilling-up of the edges of plates prepared by the gelatine-bromide pellicle, describes in a letter to a correspondent how he has managed to entirely overcome these difficulties:—I have found (he says) that the addition of a small quantity of common Epsom salts (sulphate of magnesia) to the water used for washing after development will allow you to wash to any extent without fear of blistering. My reason for using this is to render the water hard, as the Dublin water is extremely soft, and I cannot get hard water otherwise. In London the water is much harder, and this I find has a wonderful influence on a gelatine film, even in carbon printing. I had prepared twelve 7 × 5 plates with the greatest care, and developed nine of them with our ordinary water, and they all blistered. I took fresh precautions with almost each plate, but all with the same result. I then recollected that hard water had been specially recommended, and knowing that I could not obtain this here I tried the addition of a few grains of Epsom salts to a jug of water for washing, and for the first time during this hot weather it was perfect. I have tried others since with equal success on plates prepared at the same time and under the same circumstances as the plates that entirely failed with the ordinary water. Cold weather, of course, has the same effect on the water as hardness, and that is, no doubt, why I did not feel the effect of it so much in the winter, although the plates always had an inclination to frill at the edges, which they do not now with the salts, and, in fact, I think this is the only way of obtaining certainty in working this useful process.

ANSWERS TO CORRESPONDENTS.

PHOTOGRAPHS REGISTERED—

A. G. Massey, Armagh.—*View of Bessbrook Spinning Mill; Three Views of the Hilden Flax Mills; Group of Bessbrook United Sunday Schools; Photograph of Orange Demonstration at Shane's Castle Park.*

☞ *Correspondents should never write on both sides of the paper.*

NOTICE.—Each correspondent is required to enclose his name and address although not necessarily for publication. Communications may, when thought desirable, appear under a *nom de plume* as hitherto, or, by preference under three letters of the alphabet. Such signatures as "Constant Reader," "Subscriber," &c., should be avoided. Correspondents not conforming to this rule will therefore understand the reason for the omission of their communications.

ALPHA.—Seven feet is quite high enough for the sides. By making the height at the ridge ten feet a sufficient slope will have been provided.

S. S. W. A.—The cause of the distortion is to be found in the margin of the lens deflecting the ray to a greater extent than does the centre of the lens.

ONE PERPLEXED.—The dark line across the negative is caused by the admission of light at the junction of the two portions of the shutter of the dark slide.

T. S. P.—You will have seen that, since your letter was written, ample details with respect to the opening of the London Exhibition have been published. Full particulars concerning the Edinburgh Exhibition have also been recently announced.

EAST LIGHT.—We are afraid that no effectual remedy can be provided, unless by the erection of an upright screen *outside* the studio roof, the height of this being such as to prevent the direct rays of the sun from gaining access to the interior.

THE EDINBURGH MEDAL AWARDS.—We have, just before going to press this week, received a telegram from Mr. Bashford, of Portobello, in which he states that Mr. Williamson is from home, and is consequently unable to reply to the letter of Mr. Neilson, published a fortnight ago.

L. W. SMITH.—After filtering the solution, throw down the gold by adding a solution of protosulphate of iron. Mix this precipitate with a little borax, and having placed the mass on a piece of charcoal, direct the flame of the gas to it by means of a blowpipe. The metal thus recovered will be pure gold.

P. G. T.—The front lens of your portrait combination will answer very well for producing landscapes, provided you do not use a plate exceeding ten inches in dimensions. Place the flat side of the lens towards the view, and let a diaphragm with an aperture of not less than half-an-inch be placed three inches in front of the lens.

ACADEMICUS.—Seeing the very fine definition in the picture, in the subject of which is included an old cart, we have no difficulty in arriving at the conclusion that you possess a very fine lens. The faults inherent in the specimens belong to the composition rather than to the chemical manipulations. The artist you name will with pleasure point out to you in what respect the composition is faulty if you call upon him, by appointment, any time during the present month.

T. LADD.—The lines are due to the wiping of the plates with a cloth that cannot have been very clean. By making use of a diluted solution of albumen (the white of one egg to a pint of water) after cleaning the glass, and applying this by means of a clean sponge, you will not be troubled with similar markings in future.

THE GELATINE PELLICLE PATENT.—In a letter we have received from Colonel Stuart Wortley on this subject he reiterates what he has said elsewhere—that Mr. Kennett took advantage of what had been discovered and published by Sayce, Bolton, Maddox, and Johnston, and "then drew a specification, and, taking the very words of Mr. Nelson for drying gelatine, patented the whole thing." Colonel Wortley has evidently overlooked what we said last week, viz., that good and valid patents are continually being made for novel combinations of old and well-known inventions. We have also received a communication from Mr. Kennett, in the course of which he brings a counter charge against Colonel Wortley of having, in the paper he read at the last meeting of the Photographic Society of Great Britain, attempted to palm off upon that body as new, and his own, certain things discovered and published by others, carefully avoiding whispering any word of his indebtedness to Messrs. Houlgrave, Warnerke, and others for their inventions. As we have already given these gentlemen credit for their discoveries in connection with the subject alluded to by Mr. Kennett, we need not publish his letter.

RECEIVED.—*English Landscape Art: its Position and Prospects.* By Alfred Dawson, F.R.A.S. In our next.

GLASGOW PHOTOGRAPHIC EXHIBITION.—We are much pleased at learning that it is proposed to hold an exhibition of photographs in Glasgow during the forthcoming meeting of the British Association in that city next month. Photographers are requested to forward their specimens, framed or unframed, before the 28th inst., to Mr. D. Ferguson, Kelvingrove Museum, Glasgow. We trust that this invitation will meet with a prompt and liberal response.

ATKINSON'S CATALOGUE.—We have received from Mr. John J. Atkinson, of Liverpool, one of the largest, if not *the* very largest, and most comprehensive catalogues of photographic specialities that has ever been placed upon our editorial table. It is profusely illustrated with lenses, cameras, enlarging apparatus, burnishers, camera-stands, head-rests, and the numerous other articles which come under the designation of photographers' requisites. To enumerate the multifarious contents of this catalogue would be as impossible as it would be to discover anything of interest to the photographer which does not find a place in its goodly pages. As will be anticipated from Mr. Atkinson's transatlantic connection, that gentleman is the English agent for all articles of American manufacture. The catalogue is well got up, and is printed on stout toned paper.

PICTORIAL DESIGNS.—We have received from Mr. Warwick Brookes, of Manchester, several portraits printed in a style which will commend itself to the favourable notice of many. Four themes are represented. One of them, the *Drama*, consists of a photograph of an elegantly-carved frame, with such dramatic surroundings as the masks of comedy and tragedy, the works of Shakespeare, &c., the whole being tastefully arranged. In this frame is the portrait of a well-known actress, placed there by means of double printing. *Art*, *Masonry*, and *Literature* are represented in a similar manner, the leading idea being the production of portraits with ornate artistic surroundings of a character indicative of the tastes or pursuits of the individual portrayed. With a set of *clichés* of these borders a photographer may be able to utilise his *carte* and cabinet portrait negatives to some purpose. The idea is excellent, and, as we have said, it will be well received by many in the profession.

☞ Editorial Communications should be addressed to "THE EDITORS"—Advertisements and Business Letters to "THE PUBLISHER"—at the Offices, 2, York Street, Covent Garden, London, W.C.

METEOROLOGICAL REPORT,

For the Week ending August 9, 1876.

Observations taken at 406, Strand, by J. H. STEWARD, Optician.

THESE OBSERVATIONS ARE TAKEN AT 8 A.M.

August.	Bar.	Wind.	Wet Bulb.	Dry Bulb.	Max. Tem.	Min. Tem.	Remarks
3	29·47	SW	60	62	73	58	Raining
4	30·03	W	57	63	71	55	Cloudy
5	30·14	N	57	63	74	58	Bright
7	30·21	W	60	64	84	53	Cloudy
8	30·18	NW	61	65	85	58	Hazy
9	30·14	SE	64	69	—	61	Hazy

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THE BRITISH JOURNAL OF PHOTOGRAPHY.

No. 850. Vol. XXIII.—AUGUST 18, 1876.

PRECIPITATED PYROXYLINE.

A recent addition to the list of photographic preparations obtainable commercially has been introduced into the market under the above name, and consists, as the title implies, of pyroxyline which has been made into collodion and, after the latter has been cleared by means of filtration or otherwise, precipitated by the action of water and dried. The advantages claimed for this new product by its introducer, a Belgian chemist, are—increased sensitiveness and an improvement in the structural qualities of the film, which is stated to be remarkably fine, while the collodion flows more smoothly and evenly than is the case with the ordinary preparation. These are certainly qualities worth striving after; but it will be a question with many as to whether the real gain is sufficiently pronounced to compensate for the additional trouble and expense entailed in the preparation of the new collodion. With a view of testing the value of this idea we have instituted a series of experiments with the precipitated cotton; but, as we are unacquainted with the details of the process employed in the manufacture of the commercial article, it is possible our results may not be identical with those obtained by its use. We shall, however, give our readers the benefit of our experience in this direction.

It will be well, in the first place, to consider the circumstances under which we have to work, and the probable results to be expected from the action of the solvents and subsequent treatment. The first and most obvious effect produced by precipitating a perfect solution of pyroxyline is the rejection of all insoluble mechanical impurities, and the production of a purifier precipitate which should be entirely soluble without residue. But the physical condition of the precipated cotton will materially affect its solubility, and in practice it is found that in some cases it is very difficult to ensure solution without an infinite amount of trouble. It was at one time asserted that the pyroxyline after its precipitation was soluble in alcohol alone; but subsequent experiment failed to substantiate this statement, and rather proved that even with the ordinary mixture of ether and alcohol solution was more difficult.

We have as yet said nothing on the subject of the action of the ether-alcohol mixture or of water upon the soluble portions of the the cotton—an action which there is every reason to believe is of great importance as affecting the properties of the precipitate. The experiments of MM. de Camuzet, Davanne, and others, published some years since, prove that ordinary pyroxyline is not, as many suppose, a substance whose composition is constant; it is, on the contrary, a variable compound, and, in addition to its being soluble in mixed ether and alcohol, is acted upon more or less according to the conditions of its manufacture by alcohol alone, wood spirit, water, acetic acid, and other solvents, to say nothing of the partial decomposition produced by most acids and alkalies. It becomes necessary, therefore, to consider whether or not the result of precipitation is a mere elimination of insoluble impurities.

M. Blondeau published, upwards of ten years ago, the result of his researches into the nature of pyroxyline, and adopted the view that pyroxyline is capable of combining with bases to form salts, and in other ways behaves as an acid; but the point most noticeable in this connection is the statement that, precipitated from collodion and dried at a temperature of 212°, it was found upon analysis to have taken into combination no less than five equivalents of water, or, according to his calculation, between thirteen and fourteen parts by weight of pyroxyline combined with one part of water, which cannot be eliminated without decomposition. The absorption of nearly eight per cent. of even so neutral an agent as water cannot fail to produce a considerable change in the behaviour of pyroxyline treated in this manner.

But another influence is at work during the process of precipitation which is capable of producing very considerable changes in the composition and properties of the pyroxyline; we allude to the solvent action of the diluted solvents. In precipitating a quantity of collodion by pouring it into water, or *vice versâ*, not only is a very large proportion of the whole lost in consequence of its remaining dissolved in the diluted solvents, but those more soluble portions upon which the organic action of the collodion depends are almost entirely removed, or at least disproportionately so, thus seriously modifying the characteristics of the original cotton. Whether such modification be beneficial or otherwise is a moot point, some taking one view of the question and an equal number the other. Probably the actual result is dependent to some extent upon the nature of the pyroxyline treated, and it may be that what proves beneficial in one case may be found injurious in another.

In our first trials with this mode of treatment the collodion was poured *into* cold water and vigorously stirred for some time. The resulting precipitate was of the usual spongy character, denser in structure, and harsher to the feel than ordinary pyroxyline. When thoroughly dry it was found to weigh little more than sixty per cent. of the actual quantity present in the bulk of collodion treated. When dissolved in ether and alcohol, which occupied nearly two hours with vigorous agitation at intervals, it gave a film tolerably free from structure, but the collodion did not seem to flow freely. Salted with four grains of cadmium iodide and one grain of ammonium bromide to each ounce it was tried against a sample made by the same formula and from the same cotton without precipitation. The result was not of a satisfactory nature, the image developing poor and thin, and seemed to be incapable of acquiring density under any of the legitimate modes of intensification. In point of density it seemed to be about equal to the unprecipitated sample; it certainly had no advantage.

In order to reduce, if possible, the percentage of loss we next adopted the method proposed by Mr. M. Carey Lea in the preparation of the chloriodo-bromide pellicle, and which consists in reversing the mode of procedure in the last case, namely, pouring the water into the collodion. The resulting precipitate was totally different in character, being thrown down in extremely minute particles very difficult of collection. After washing several times upon a filter the powder was dried and weighed, showing a still greater loss than in the previous experiment. This may be partly due to the extreme difficulty we experienced in washing the finely-divided precipitates, much of which may have been lost during that operation. As regards photographic properties, the specimen was practically identical with the last. In our next trial we poured the collodion gently on to the surface of the water, hoping that the latter

would penetrate gradually and precipitate the pyroxyline; but it was found absolutely necessary to stir the two together. By doing this gently we managed to incur very little loss; but the cotton, when dried, was so horny and impervious in character as to resist the action of the solvents for several hours. We repeated the same experiment, however, taking the precaution to divide the precipitated cotton into small fragments while wet, which rendered it much easier to dissolve. When redissolved it was tested against the other samples, with which it compared favourably, both as regards the quality of image and facility of intensification; in point of sensitiveness no difference could be gained.

In order to decrease the loss by precipitation we next poured out a quantity of collodion, and, after allowing it to set, washed it in the manner usually followed in preparing pellicle. The product thus obtained was in thin flakes, and bore a great resemblance to gelatine. When placed in the mixture of ether and alcohol it dissolved with readiness, though, necessarily, not with the same rapidity as the ordinary cotton. The resulting collodion was clear and bright, showing no need of filtration. When salted, and, indeed, treated generally, as in the previous cases, a much more favourable result was obtained. The collodion flowed easily, and was remarkably free from spots and structural markings—two or even three films dried one over the other being scarcely discernible upon the glass, yet when sensitised giving a dense layer of iodide. As previously, we failed in detecting any advantage on the score of rapidity, though, owing to the absence of any tendency to harshness, it was possible to force the development to a greater degree than usual, thus, perhaps, affording a chance of cutting down the exposure in special cases. The developed image was fine and even in grain, and, though perhaps rather more difficult to intensify than in ordinary cases, no special objection can be urged against it on that score. On the whole, the results produced were of a very favourable character.

The question will probably be asked whether any sufficient advantage is gained to compensate for the extra expense involved in the solution and precipitation of the cotton. This we can scarcely answer, but must rather leave it to the judgment of our readers. We may, however, remark that the increased cost need only be comparatively small. It is by no means necessary to employ expensive solvents, the methylated behaving equally as well as the higher-priced sample. In a portion of our experiments we made use of wood naphtha in place of alcohol—not only on account of its cheapness, but because it permits the proportions of the more expensive ether to be diminished to a greater extent than when alcohol is used. Thus, four ounces of methylated ether and sixteen ounces of wood naphtha mixed will dissolve half-an-ounce or more of good soluble pyroxyline quite as well as the usual mixture of equal parts of ether and alcohol.

INSTANTANEOUS PANORAMIC VIEWS.

A few days ago we watched with interest certain futile attempts made by a photographer to secure a sharp, instantaneous view of a large field, in which several groups of boys playing at cricket formed the subject upon which his pictorial labours were concentrated. From the only point from which the picture could be secured the angle of view required to be included exceeded a hundred degrees; but, although the greater part of this was embraced when an abnormally wide-angle lens was employed, the boon was acquired at the expense of so great a sacrifice of light, owing to the employment of a nearly pinhole diaphragm, that a cricketer could run from one side of the field to the other during the time of exposure. By resorting to a portrait lens and a drop shutter immediately in front of the sensitive plate particular groups were secured in all the requisite action and with perfect sharpness; but such delineations were of too isolated and incomplete a character to be of much value, forming, as each of them did, only a tenth part of the view intended to be taken. What course, then, should a photographer take when placed under circumstances such as we have described?

A pantascopic camera would, of course, immediately solve the difficulty—at any rate, it would certainly enable a view of a very wide field to be obtained, although in consequence of being fitted with a landscape lens it would fail in depicting figures in motion. But "a grain of practice is worth an ounce of theory" in such a case; and in less than half-an-hour we had our small pantascopic camera directed to the field in question with a wet collodion plate in its slide. The result was what we had anticipated. As the exposure was protracted over several seconds on each portion, many of the figures were indistinct, occasioned by their motion. But reasoning that, as a shorter exposure could only be given by increasing the rapidity of the motion of the clockwork, and that such increase would produce a much under-exposed negative—for the lens was already working with the enlarged or fixed diaphragm—it would be necessary to substitute a portrait lens for the landscape combination; and this, after much trouble in selecting and adjusting lenses so as to form an objective of the same focus as that about to be superseded, was eventually done. The fly of the clockwork was now set with its edge in the direction of the revolution, and a second picture was taken, which proved to be very much over-exposed, notwithstanding the rapidity of the motion.

Those who are familiar with the kind of camera of which we are speaking are aware that, while the camera is revolving by means of clockwork, a shutter having a vertical slit is made to travel from end to end, and in front, of the sensitive plate during exposure. Now, as the width of this slit is adjustable, it will be apparent that by making it exceedingly narrow two objects will be gained—the exposure any part receives will be shortened in consequence of the narrowing that is effected, over-exposure being thus avoided; and the chances of any motion of any object in the view being rendered apparent in the negative will be much reduced.

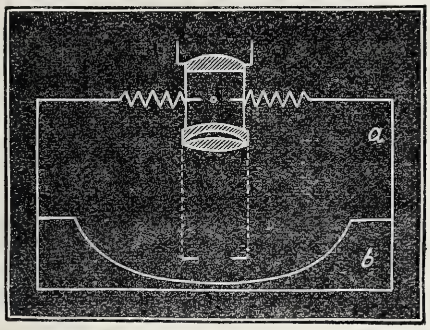
The degree of rapidity resulting from the substitution of a portrait for a single combination is so great that in a good light, and when taking subjects demanding an exposure of (say) a tenth or twentieth part of a second, it is better to dispense with the clockwork altogether, rotating the camera by grasping it with the right hand, and giving it a rapid rotation from side to side of the view. The actual time occupied in exposing the plate during its sweep over an angle of 120°, or exactly one-third of the circle, was two seconds, during which time a slit under a quarter of an inch in width, in an opaque shutter, was passed over the surface from end to end.

All this, it may be said, is very well for those fortunately possessing cameras of the kind to which reference has been made; but what is to be done in the absence of such an instrument? This, too, we have not only thought over, but have extemporised the construction of a camera that will be acknowledged to be not only well adapted for the purpose, but one which will fall within the constructive power of every mechanic. This we shall now describe.

If the reader direct a portrait lens to any brightly-illuminated object, and then hold at its focus a sheet of paper on which to receive the image that is formed, he will find that, if the lens be grasped by the finger and thumb midway between the ends of the tube, it may be oscillated—the portions under the points of the finger and thumb respectively acting as centres—without any motion of the image on the sheet of paper being perceived. To realise this: let the lens be first grasped, in the manner indicated, by the outer end of the tube, or opposite to the position of the front lens. Now focus the image and oscillate the combination, holding the supporting finger and thumb quite steady. It will be found that with every vibration of the lens the image on the paper becomes displaced, its motion being in the same direction as the posterior end of the tube. Having noted this, shift the grip of the lens to any point near to the back lens, and again focus and oscillate the combination. An effect quite opposite to that previously observed will now be produced; for, while the oscillation of the lens will cause a vibratory motion of the image, it will be in quite an opposite direction. Now, we wish it to be particularly observed that there is one point between these two extremes at which, if the lens be grasped and oscillated in the manner indicated, the image produced on the paper will be *quite stationary* notwithstanding the movement of the lens. This point

is easily ascertained by experiment, and to facilitate reference in the present article we shall call it the "centre of the lens."

A base-board having been procured for the camera, the lens must be fixed upon a pivot so as to be capable of rotating, the centre of rotation being the "centre of the lens." Premising this much we must now have recourse to the services of a diagram, in which *a*



represents the camera and *b* the dark slide, which must be somewhat thicker than usual. The view here given is supposed to be from above. The lens, which is pivoted so as to rotate in a horizontal direction, has attached to it a projecting piece, which in the camera we constructed was formed of cardboard. This piece is shown in the diagram as an extension backward from the lens, to which it is fixed, reaching nearly to the sensitive plate. A side view of this projecting piece would show it to be of such width at the posterior end as to extend from top to bottom of the plate.

With respect to the plate upon which the negative is to be taken: it being inexpedient to employ a curved plate of glass—for the simple reason that none was readily accessible—we inserted in the slide a block of wood the size of the plate, but in thicknes exceeding an inch, the front surface of this block being curved, as shown in the diagram. The radius of the curve is equal to the focus of the lens when measured from the "centre of the lens." Taking advantage of a hint received several years ago from Mr. J. R. Johnson—who at one time devoted much of his attention to cameras of a similar character to that we are now describing, and which we suppose have also been thought over and possibly constructed by others—we collodionised a thin plate of ebonite, which, when fastened at the ends, adapted itself in a perfect manner to the curvature of the wooden block in the slide, and from which, after development, the film was removed and transferred to a plate of glass. A dry pellicle of the *Warnerke* class appears to be more convenient than anything we have yet tried; for with it there is no more trouble than would be experienced were the exposure made in an ordinary flat slide. An improvement in the manipulation of such a film would consist in the insertion of a cylindrical plate of glass in the dark slide, against the rounded surface of which the pellicle would be pressed in close contact by means of a padded, curved board placed behind.

The lens, being a portrait combination, has a large angular aperture; and hence when the light is good an exposure of a fractional portion of a second suffices to produce a well-impressed negative. The exposure is effected by rotating the lens on its centre, so as to bring its axis beyond the end of the sensitive plate. The lens is now uncapped, the shutter of the slide having been previously drawn, and by a motion of the hand the lens is rotated so as to be axially placed on the opposite side of the camera, every portion of the plate having during the rotation been exposed to the strong light poured upon it through an unstopped portrait combination. We need scarcely observe to any reader who is at all conversant with optical science that the contracted aperture, or slit, shown at the posterior part of the projection from the lens does not in the slightest degree diminish the intensity of the light which forms the image in its axis.

The gusset shown in the front of the camera permits the moving of the lens from side to side without any leakage of light.

It is obvious that in the camera now described there are numerous details which, if they were here presented, would unduly extend this article. Enough, however, has been said to stimulate those readers to whom such a camera might prove a great boon.

ALKALINE PYROGALLIC ACID.

Notwithstanding the contradiction in terms involved in our title, its meaning is perfectly well understood; and as it is generally a difficult matter to change a name which has become almost universally adopted we suppose it must stand as it is. In continuation of the experiments mentioned last week in our article on alkaline development we were anxious, not so much to get information as to the real office of the alkali in connection with the action of pyrogallic acid, as to ascertain the differences in behaviour, if any, between the various alkalies that have been recommended by various operators.

Ammonia, either as caustic solution or in the form of a carbonate, has hitherto met with most general favour; but our readers will remember that the late Mr. Sutton strenuously advocated, and generally employed, carbonate of soda; but more recently calcic hydrate, in the form of a saccharine solution of oxide of lime, has been used with advantage. Calcic oxide is only very sparingly soluble in water, and the solution—ordinary lime water—is very unstable if exposed to the air, becoming rapidly converted into an insoluble carbonate. In the presence of sugar it is much more soluble, and the solution keeps well.

A very convenient solution may be made by moistening with water a piece of good Irish lime, the size of a walnut, and when it falls to powder putting it into a ten-ounce bottle. To this is added five ounces of refined sugar, and sufficient water to nearly fill the bottle, which must be occasionally well shaken for three or four hours, and then allowed to stand till the liquid is quite clear. The *liq. calcis sacch.* thus made is six or eight times the strength of ordinary lime water, and may conveniently be added in any desired quantity to the pyrogallic acid solution. We may add that we have not in our experiments found it necessary to use a bromide or other restrainer, the sugar seeming to keep the negatives quite free from fog.

It will be remembered that a neutral solution of pyrogallic acid developed after a considerable time a feeble image on an exposed emulsion plate, and that a strong solution of carbonate of ammonia gave an intense picture on plates containing traces of tannin or pyrogallic acid, but seemed to have no action on films of simply washed silver bromide.

With a view to examine the action of those bodies on larger quantities of silver bromide a quantity was precipitated and well washed, and one half thoroughly dried before submitting it to their action, the other half being used while still moist, as it is well known that the solubility and other properties of many bodies are different when freshly precipitated from what they are after having been dried and again moistened. In a series of test tubes we placed quantities of the silver bromide of both kinds, and some of each were exposed to light, the others not being taken out of the laboratory, and the various solutions were then added and the tubes well shaken. In no case was there any visible action between the neutral pyrogallic acid and either the fresh or dried silver bromide that had not been exposed to light, and hardly any perceptible action on that which had been exposed, although with the freshly-precipitated salt, after some time, the solution got slightly darker, and a faint trace of bromine could be detected. A solution of caustic ammonia—one part of *liq. ammon. fort.* to ten parts of water—had very little action on the dried silver bromide, but dissolved readily a considerable quantity of that freshly precipitated. The same remarks apply, but in a much less degree, to the solution of the carbonate of fifty grains to the ounce; and there seemed to be no difference in solubility between those exposed to light and those that had not.

Solutions of soda carbonate and calcic hydrate were then respectively employed; but in no case was there any appearance of a dissolving action, and no trace of the silver salt could be found in either. On the addition, however, of a single drop of an alcoholic solution of pyrogallic acid the bromide salt that had been exposed was instantly affected, and, after a short time, unmistakable indications of bromide were obtained.

A number of emulsion plates were then exposed, under as nearly as possible identical circumstances, to a suitable test object—a bouquet of flowers—and developed with solutions of the four alkaline solutions of pyrogallic acid. While they each gave good negatives

they were not equally satisfactory, or by any means similar in their action. The lime, even without restraining bromide, gave a clean but somewhat feeble negative—the kind of deposit that seems always to require strengthening by pyro. and silver treatment. The soda was much slower in its action, and the negatives were wanting in softness, and rather hard and under-exposed in general appearance. The caustic ammonia, while rapid in action, and to a certain extent satisfactory, has a tendency, under certain not quite clear conditions, to dissolve the image it has assisted to form, and so must be used with caution, where much forcing is required; but it is so easily obtained of uniform strength, and keeps so well, that it is, on the whole, a valuable "alkaliser"—if we may be allowed to coin a term—when full exposures have been given. For general use, and under almost all ordinary conditions, the carbonate of ammonia is, we think, the best. It may safely be used up to the full strength of a saturated solution, and if sufficiently restrained by a bromide will always work perfectly clean.

From one or two experiments we have made we are inclined to think that collocine may be substituted for a bromide with much advantage, so far as rapidity is concerned; but that question requires further examination. The only objection to the carbonate is the difficulty of getting and keeping it in good condition; but that need not stand in the way of its general use, as any chemist, when he gets a fresh supply, will willingly select for a customer a few fine crystalline lumps. These may at once be dissolved in water to any required strength, and the solution, if in a stoppered bottle, will keep indefinitely.

A HINT to carbon printers. The temperature we have experienced during the last few weeks must have tried severely both the patience and skill of all who work the carbon process unless they have at hand the appliances necessary for the production of artificial cold. It is not only that the heat operates against comfort and success in sensitising the tissue, but it also acts injuriously upon the gelatine film after sensitising, and seriously interferes with development. It is scarcely necessary to enlarge upon the difficulties experienced in the process of sensitising tissue in the hotter seasons of our year or to describe the means of getting rid of the trouble; but we have no doubt that many of our readers have not the necessary facilities for artificially lowering the temperature in order to prevent softening of the film, and, even if they have, would probably prefer to resort to silver printing as being less troublesome. The difficulties connected with development may arise from the too easy solubility of the tissue, in which case they are overcome without much trouble, or from deterioration of the tissue after bichromatising. In either case much depends upon the nature of the tissue, as much may be done in the course of its preparation to make it suitable for use under special circumstances; but, leaving that point out of the question, it is possible to do still more in the way of lessening the uncertainties and irregularities in its working. A few weeks ago we had occasion to notice the researches of Dr. Monckhoven, publised at page 233 of the our present volume, upon the effects of acids and alkalies upon the gelatine tissue, and since we penned those remarks we have had personal experience with the benefits accruing from the adoption of his principle. Briefly stated, Dr. Monckhoven finds that the effect of acids is to retard solution of the film and to produce a finer image; while alkalies, on the contrary, increase its solubility, but with a tendency to granularity in the picture. By adding from five to ten drops of sulphuric acid to the pint of sensitising solution, we have been able to obviate all danger of the tissue dissolving during the operations of sensitising or drying; and if the same addition be made to the water used in developing—but this is scarcely necessary after using the acid on sensitising—the action of the warm water will be perfectly under control. In using tissue which has become partially insoluble from spontaneous decomposition, the addition of a little ammonia to the developing water will considerably increase its solvent powers. By a judicious use of either acid or alkali nearly all the difficulties experienced in working the carbon process in hot weather will disappear.

DEFECTS IN PHOTOGRAPHIC PAPERS.

No. II.

IN my last paper I alluded to the defective quality of the Saxe paper, and which we were compelled to use for several years or have none at all. Some ten years ago this class of paper seems to have been handled, in its preparation, in quite a different manner from that employed for the last three or four years. At the former period it showed a very fine texture, and if looked at by transmitted light appeared as if permeated by minute pinholes. That peculiar characteristic, combined with the open and hard nature of the pulp, seems to have been the means of freeing it from the tendency to produce blisters in the prints; but the same quality also prevented it from carrying a proper coating of albumen.

At the above period Rives paper, if not prepared with albumen of a special sort, was greatly disposed to that vexatious defect—blistering. The deterioration in quality of the Saxe paper alluded to threatened almost to throw it out of the market, and it has actually been superseded to a large extent by Rives, and more and more so recently.

It is perhaps of little consequence whether I am able or not to give any reason why this change for the worse had occurred in the Saxe paper. If, however, I may hazard an opinion, I might suppose that the demise of old Steinbach—the original owner of the Saxe paper mills—which occurred about four years since, had something to do with it, for from that time the falling off has gone on. With a decrease in the consumption of that paper, and a demand for photographic paper of one or the other sort still keeping up, a considerable strain has been thrown upon the resources of the Rives makers, which, last year, for instance, would, no doubt, become rather severe.

Will this tax upon their powers of production aid in accounting, therefore, for the difficulty which they seem to have experienced in supplying a proper quantity of an uniform, first-class quality? Be this the reason or be it not, I have, in common with others, experienced great difficulty in procuring Rives paper this year that will give uniformly good results either in our hands, as albumenisers, or in the hands of my photographic friends when put under the printing frame. Some large consumers of both kinds of the paper have told us that this year they have experienced more annoyance, vexation, and loss from the diversified and often inferior quality of the paper than they have ever before in the same length of time been subjected to.

The defects to which photographic paper is liable are manifold—some of which may be remedied partially, while others may not. From one serious defect, which existed for a long time, we have been now almost entirely delivered, namely, metallic specks; but that was not remedied on the part of the Rives makers until the paper had become nearly unusable. This evil, of course, arises from metallic impurities getting into the pulp with the rags, and will exist more or less according to the amount of care exercised in the sorting of the material; so that, by employing thoroughly careful hands in preparing the material of the pulp, we ought to enjoy perfect immunity from that particular defect. Another defect which does not give much trouble now was a tendency to blistering, which was almost peculiar to Rive paper. This was, no doubt, chargeable to the particular composition of the sizing employed, the quantity left in the body of the paper, and its being partially or entirely insoluble. If the latter, it would, of course, prevent the escape of any gas which might be generated between the albumen film on the surface and the size in the body of the paper during the process of toning and fixing the prints, as it is known that these blisters are always developed when the prints are being fixed. I shall not charge to the paper-maker the sole fault of causing blisters, because the same defect may be originated by the employment of an albumen of a certain kind. It is now, however, rarely that this happens.

Another defect still common to both classes of paper is the occasional appearance of minute white specks on the prints—sometimes so numerous as to render the prints useless. This may arise from the presence of a residue of some of the chemicals employed in the reduction of the rags not being entirely washed out of the pulp, and may be found in but a very small portion of a large batch of paper. This defect must be in the paper, because, by a singular coincidence, it was discovered in paper prepared at two different albumenising establishments at the same time, which fact, I believe, will be held to be evidence sufficiently conclusive that it would not be caused by any impurity connected with the albumen.

I have not quite exhausted my enumeration of the defects of our great staple article; and now to come to the most serious of all the

defects with which we have to contend, and which, notwithstanding all the care that I presume has been exercised in its manufacture, too frequently shows itself. This, the last I shall notice, consists of a general softness in the composition of the body of the paper, and seems as if the pulp had not been so treated, either chemically or mechanically, as to produce a proper compactness and, consequently, hardness in the fibre of the paper. It may be due also to the character or condition of the rags or quantity of sizing employed. Whatever be the cause, the effect is this, viz., that owing to the soft and absorbent quality of the paper the albumen cannot be kept properly on its surface; hence the salt in the albumen penetrates its body, and consequently the picture, which should be upon the surface, is partly in the body of the paper, and thereby a dull and ineffective print is the result. This, of course, at once condemns the paper as "rubbish"—fit only for wrapping, chemists' labels, or for covering jelly pots, &c.

Now photographers will, perhaps, at once say—"Why buy paper from a manufacturer if it be not in every way quite perfect?" I can merely reply—"We can obtain only what is in the market, and there is but one market to go to; and when a batch of paper is once prepared for sale it must be used up before another is offered." There is, therefore, no choice. If the manufacturer would lay aside this batch, when prepared, for a few months, and allow it to harden, and, perhaps, then give it an additional *rolling* before sending it out, it might come all right; but where would be the supply all this time, which has almost all along been a hand-to-mouth one, seeing also that it requires months to prepare a batch of pulp for the machine?

My readers will probably now ask—"What is to be the practical outcome of these remarks?" But I would ask, in return—"Is it possible that our photographic friends could occasionally help the poor maligned albumenisers, upon whose devoted heads falls the blame of all the defects in paper, and of all the queer results which sometimes show themselves in prints?" I say, can they not render aid in obviating the unsatisfactory results so frequently obtained? I do not for a moment doubt that they can. I would, however, with considerable diffidence here offer a few remarks.

I suppose I need scarcely allude to the fact that there is a great diversity in the *modus operandi* employed by different photographers. It is preposterous to expect, therefore, that the results of all these could be even generally satisfactory, not to say always good. Even supposing the paper supplied in every case were unexceptionally perfect, it has been found times without number that what one man rejects as "rubbish" is the very thing the next one requires. But what I wish to say is this—that very frequently, on the first hasty trial, a sample of paper is thrown aside as defective when all it requires is only, perhaps, a slightly different treatment. I shall suppose, for instance, the paper has just been taken from the albumen bath, and may not have acquired that hardness on the surface which would fit it for any or every bath it might be floated upon. In such a case a moderately weak silver bath might not give a desirable result, whereas a somewhat stronger and more active solution might produce a fine print; or such a sample might be tested with a bath at a very low temperature, on a damp day, when neither paper nor silver is in a very fine condition for coming into contact. I think I might venture to say that nothing in use by a printer would suffer much by being kept in an even temperature of say about 70°, only it might be well to remark that, though not perceptible, where such a heat is constantly maintained and where baths are standing there is generally more or less of vapour about; hence it would be well if photographic paper be kept away from such in order that it may be in a properly dry condition for use.

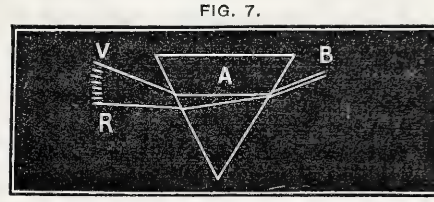
Another source of irregularity might be guarded against by testing the neutral or acid condition of the albumenised paper before being even tried; for it will be found that different samples of paper will vary considerably in that respect—more especially at some seasons of the year. In a hot summer, like the present, it is almost impossible to prevent albumen from becoming more or less acid. To meet, therefore, and neutralise that condition of the paper it will be necessary to render the silver bath more or less alkaline. This is a matter I reckon of first importance. It has become a pretty general practice to render the silver bath about neutral by keeping in bottle a quantity of carbonate of soda, into which the bath is decanted after being used for the day. A small quantity of ammonia dropped into the bath will, perhaps, answer better, and give a richer tone to the print, only it must be used skilfully.

I may further remark that a paper with a soft or spongy body, although it may appear to have a fair surface of albumen, would require to be very quickly coagulated, so as not to allow the silver solution to soak into into it, by using a fairly-strong bath—say sixty to eighty grains—and floating a short time—say one minute or a little more—instead of using a weak bath and floating long. The latter mode would greatly aggravate the evil, and certainly produce paper defective enough. I do not by any means wish to write an apology for bad or defective paper; but I think if the character or characteristics of the paper were intelligently studied it would often be employed with more satisfaction both to the consumer and manufacturer. In the course of my career as preparer and seller of photographic paper I have frequently met with such instances as the following:—We supply a customer with a lot of paper apparently all right. On the first trial, however, our friend finds it all wrong, and writes that he must return it at once—"no use trying it again." He wishes us to pay return carriage; that is objected to. He thinks over that matter of the carriage for a week, then tries the paper again, and he then reports that he somehow finds it all right, resolves to keep it, and ultimately finds it "the best he ever had." J. Skinner.

ON LENSES.*

So far we have considered a ray of light, refracted by a transparent medium, to be still a single ray. Such would be the case were the white ray of light of a single homogeneous colour; but what we call "white" light is composed of different-coloured rays, which, by passing through a refracting medium, are refracted in different degrees. This is the source of another aberration of even more importance, than the spherical aberration—the chromatic aberration. By passing a beam of white light, B (*fig.* 7), through a prism, it is not only refracted, but decomposed into seven colours—red, orange

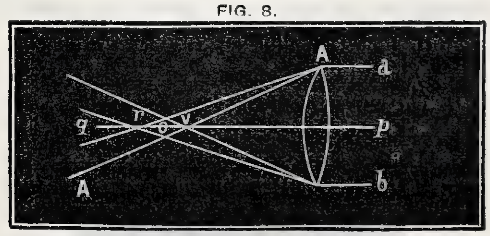
FIG. 7.



yellow, green, blue, indigo, and violet. These different-coloured rays are differently refracted by the prism. The violet ray, as the most refrangible one, is refracted towards V, and the red one, as the least refrangible, is refracted towards R, and other coloured rays fill out the space between V and R in the order of their refrangibility. This is known as "dispersion." The dispersion of refracting media is measured by the length of the spectrum which they produce. Flint glass has more dispersive power than crown glass, because the spectrum which it produces is longer than that of crown glass. The dispersion of a medium is indicated by the difference of refraction between the index of refraction of the red and the violet. Let us now see what effect the dispersion has on images produced by single lenses.

White light a and b is falling on a double lens (*fig.* 8). The ray a is decomposed into the different-coloured rays as soon as it enters

FIG. 8.

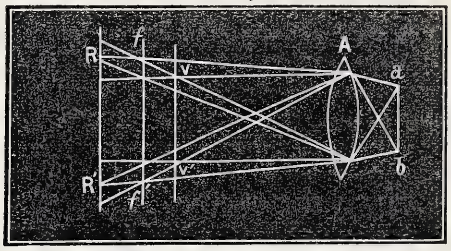


the lens, and the red ray, as the least refracted, will cross the axis $p\ q$ in r, while the violet ray crosses the axis in v. Between the red and violet the other coloured rays cross the axis. The same with the ray b, and if we do not consider the spherical aberration of the rays between a and b all the red rays will have their focus at r, and all the violet ones at v. Between r and v the foci of all the other coloured rays are situated. The space between r and v is called the longitudinal chromatic aberration. The length of the aberration changes with the dispersive power of the media out of which the lens is made; it is, for instance, twice as great if the lens is made of flint glass as if the lens were made of crown glass. The influence of the chromatic aberration on the image of a lens is shown in *fig.* 9. The white light from the object $a\ b$, refracted and dispersed by the lens A, does not form a colourless image $f\ f'$, but the red rays form one at R and R′, and the violet at V V′. But between these an endless number of coloured images of rays of different refrangibility are produced. The red

* Continued from page 356.

image is the largest. If we place a screen at R R′ we do not get simply a red image, as all the other dispersed images are formed on the screen; and as the mixing of all the different colours of the

FIG. 9.

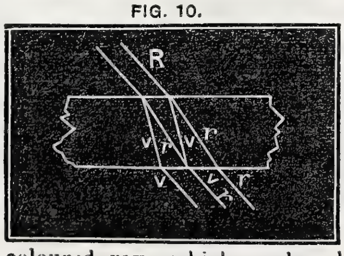


solar light make white light again, so the mixed images—that is, the central part—is colourless, and only the margin is blue, because it is surrounded by the diffusion image of the blue diverging rays.

If the screen be moved to V V′ then the image is surrounded by a red margin; if it be moved to $f f'$ the coloured margin disappears, but the image, composed of the different dispersed images, appears undefined and not clear. This effect is more increased, because each coloured image has its spherical aberration also. Chromatic aberration alone would place the different coloured images in regular succession behind each other; but spherical aberration mixes these images of different colours, and only the two outer ones, red and violet, remain. From the foregoing it is clear that chromatic aberration must necessarily interfere with the definition of a lens, and that it is desirable to find a way to correct this evil. From the moment when Newton unravelled the nature of solar light, proving that light is composed of rays of different refrangibility, our greatest philosophers and opticians have spent their time and skill in the attempt to produce lenses without chromatic aberration, or at least to reduce it to a minimum. Sir Isaac Newton was of the opinion that refraction and dispersion of different refracting substances are always in the same ratio to each other, and concluded that it was hopeless to produce refraction without colour by combining convex and concave glasses. Leonhard Euler, the great mathematician, on the other hand, reasoned in another way, and this is a curious instance of how a correct conclusion was drawn from false premisses. He assumed that the human eye is achromatic, and, consequently, a lens could be made achromatic too, and Newton must be in error. He constructed theoretical rules for making achromatic lenses, and Dollond, the optician, succeeded in carrying them out. But Dollond, by comparing the eye with his lenses, observed that the eye cannot be achromatic; and Fraunhofer afterwards measured the chromatic aberration of the human eye, and found that an eye that is able to bring parallel rays of red light to focus on the retina can only bring violet rays to a focus coming from a distance of two feet.

Now, let us see how we get rid of those beautiful colours which we admire so much in the rainbow and the glittering dewdrop, but which hurt the eye of an optician in an optical instrument. If a ray of white light, R (*fig.* 10), fall obliquely on a parallel plane glass it is decomposed as soon as it enters the glass; but on the

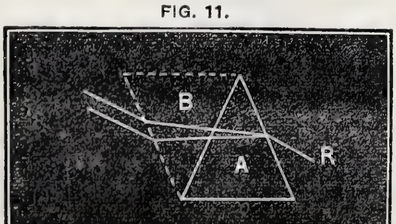
FIG. 10.



other side all the coloured rays which made white light are, on leaving the glass, parallel to its former direction. If we think the whole surface of the glass struck by white rays, they all will be dispersed, and come out parallel on the other side; but if the different-coloured rays are mixed homogeneously it makes white light again.

But if a prism A (*fig.* 11) is struck by an oblique ray R the ray is dispersed in the glass, and the coloured rays leave the prism

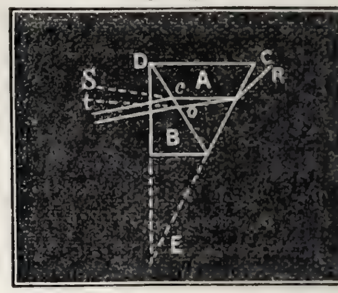
FIG. 11.



diverging, and they cannot be properly mixed again to white light, except we can give to the leaving rays their parallelism again. Now, if we combine a prism B of the same angle and material in a reversed position to A it is evident that we restore the diverging rays again to parallel rays; but, unfortunately, we destroy not only the dispersion, but the refraction—we make a thick, parallel glass out of the prism.

Let us try it in another way. The ray R (*fig.* 12) passes into a prism of crown glass A, and a coloured image would be formed at

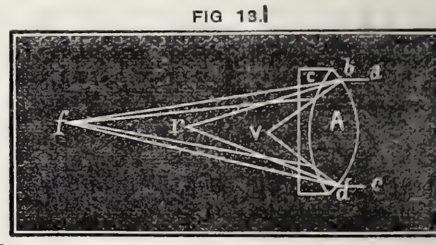
FIG. 12.



s t if the prism B would not interfere. If we now could combine with the prism A one of a less angle, but made from material, like flint glass, of greater dispersive power, so as to have the same dispersive power as the larger-angle prism A, we can restore the diverging into parallel rays, and the light will come out white again, although it went through the compound prism C D E. This is perfectly practicable, if we make the prism B of flint glass—this having a greater dispersive power than the crown glass, and the rays *c* and *d*, when entering the prism B, are somewhat refracted—the violet more than the red—and their divergency is smaller. If the prisms have the right proportions the red and violet rays come out into the air parallel, and, at the same time, the rays passing from the prism B will have a different angular direction than that with which they entered the prism A. Thus we have refraction without dispersion.

Let us adapt this principle to a lens, A (*fig.* 13), made of crown glass. The rays *a* and *c* enter the lens at *b* and *d*, and are dispersed;

FIG 13.



the red would cross the axis at *r*, and the violet at *v*. We associate the plano-concave *c*, of flint glass, with the lens A. As the negative flint lens is of a denser medium, the violet, as well as the red rays, will be refracted, but the violet more so than the red; and, if form and dispersive power of the two lenses are in the right proportions, the red as well as the violet will meet at the point *f*. The image formed there is colourless, or achromatic, or, in other words, it will appear in its natural colours. But even in the best achromatic lenses there is still a small amount of colour left, which cannot be destroyed. If we compare the spectrum of a prism of crown glass with one of flint glass of the same angle, we find that the more refrangible blue, indigo, and violet take not only absolutely, but also relatively, more space than one in the spectrum of the crown-glass prism. So, if we succeed in uniting the outer rays, red and violet, the intermediate colours cannot unite completely, and this remainder of not corrected coloured rays we call the "secondary" spectrum. Complete achromatism, therefore, cannot be obtained; but we must be content to come as near as possible to the requirements. A selection of crown and flint glass, in which the proportion of length of the spectra of the different rays are nearly related, will bring us very near to our purpose. Fortunately, the colours of the secondary spectrum are feeble, and do not interfere much with the sharpness of the image; and we are well pleased if a lens exhibit only the secondary colours—light purple and greenish—as it is a proof that the most objectionable effects from achromatism are removed. The association of flint and crown glass serves not only to correct chromatic aberration, but, as we have seen before, if the right form for each of a pair of lenses be selected it corrects spherical aberration also. Such a lens, corrected for spherical and chromatic aberration, we call an "*aplanatic*" lens. JOSEPH ZENTMAYER.

(To be continued.)

ON THINGS IN GENERAL.

I am glad I am not an editor! The mere thought during such weather as we are now having—at any rate in the south—of sitting in an office all day long in the continued receipt of angry personal letters full of recriminations, but empty as regards photography, and forced to hold the mental scale of justice between rival inventors and disputants, would put me in such a fume that I should clear out from the office, telling the boy to inform all callers I had an urgent telegram from Mont Blanc or some other such frigid region!

Surely the Editors of The British Journal of Photography must have been sorely tempted from the path of duty and virtue when they found their beloved "Peripatetic" tripping on a topic of ice, of all things in the world. Imagine, my readers, with the mercury almost oozing through the pores of one's thermometer having to discuss this freezing question. What irony of circumstances! I should like to have heard the "wigging" that the "Peripatetic Photographer" speaks of, about the "amalgamation" question. I cannot tell my readers anything about this magma; but I know that the magma (I must be particular) of ice and wine of Xeres, partaken of through a section of wheaten stem, and vulgarly yclept "sherry cobbler," is in great request in the studios I have visited of late, though I am assured by one gentleman that soda water and milk is by far the most refreshing and cooling mixture to drink in the studio it is possible to have during these "melting moments."

I am thus not at all surprised at the paucity of invention shown by foreign photographers; yet it is a strange thing that most of the *soi-disant* novelties from abroad that we do read of are furbished-up items six months' old here, or else futile and absurd contrivances, not even fit for a place in the Science Exhibition at South Kensington.

What a long way behind they seem to be, to name an instance, in photometers! There was positively an instrument exhibited the other day at the meeting of the Photographic Society of France to which this name was given, though the apparatus was of no use whatever to indicate the power of the light—it was in truth a photometer exactly, and by no means an actinometer.

So, again, it is only within the last month or two that French *savants* have awoke to the knowledge that there is an instrument called a "radiometer," which has been exciting a lively interest in English scientific circles for a long time past. It is not alone in photographic, but in the more purely scientific, bodies that one of the wonders of the last two years has been entirely lost sight of or ignored. Now the study of its phenomena is being prosecuted with ardour just as Mr. Crookes himself is coming, unfortunately for photographers, to the conclusion that its indications may be considered to have merely a thermometric origin and cannot be of use for actinometric purposes. So, also, that most clever little hot-water producer, the geyser, was exhibited the other day as a novelty, the instrument having been in successful use for many months on this side of the channel.

I find, however, that there are some novelties which get across the water in something like a reasonable time; for I noted in the *Moniteur*, the other day, that their English correspondent giving an account of Brown's new mezzotint process. Speaking of process-mongering, he says this farce is regularly played once or twice in the twelve months. It is already a sort of photographic institution, and is classed in London among the amusements of the season. If I am delighted that no man calls me "editor," to a still greater state of beatitude do I attain when I think of my not being an inventor, for no one in the world could act on the contradictory advice given from editorial chairs. One runs something like this:—"It is degrading to an open and liberal profession to patent what should be freely given for the common good." Another: "The true mode is to work the novelty yourself, quietly making all ready, and then to burst on the astonished world and make your fortune before others know what you are doing." Another: "If you have worked your discovery privately, and someone else goes and patents it and demands from you a royalty, you have only yourself to thank for having failed to make it public." So on, till the luckless discoverer, left in the position of the celebrated individual and the stools, relies upon the promptings of his inner self alone and usually makes a pecuniary mess of it—a few brilliant exceptions only to the contrary still remaining as beacons or lures.

I saw, also, in the *Moniteur*, a little while ago, an account of a prize essay on iodine and bromine, published in an English paper. After a deal of research I discovered the periodical in question—a new publication of the trade-circular order. It stated that an extraordinary number of essays had been sent in for competition, the subject being *Iodine and Bromine: their Sources and Preparations.* The prizes were £10 and £5, and the space the essay was to occupy was strictly limited. I should think, however, that the two essays printed were the only ones received, otherwise the adjudication must have been conducted on principles *sui generis* and of the most extraordinary nature ever heard of; for the second prize essay did not name a single preparation of iodine and bromine, and the first prize was awarded to an essay which occupied almost double the allotted space!

I should very much like to know whether that well-written and wonderful story of the half-murdered lady and her *cartes* given in last week's Journal is intended to be believed; or whether it belongs to that class of fearsome *jeux d'esprit* so much affected by *Cornhill, Blackwood*, and some minor fry about a dozen years ago.

There is also another interesting statement about which I should like to ask—"Is it true?" I allude to the new glass tempering process of Herr Pieper and the £15,000. If we can get practically unbreakable glass articles it will be an inestimable boon if nothing but negatives and glass baths received the aid of the new treatment.

I was rather amused when reading an extract from *Anthony's Bulletin* in the Journal for July 21. The writer treats his bath with permanganate of potash and exposes to light "for a short time." He says "every particle of organic and foreign matter will be precipitated, leaving it so pure as almost to look blue, and then if you wish to rid it of alcohol and ether bring it to the boiling point," &c. It is usually thought that alcohol and ether are *organic* matters, and I, certainly, when my bath contains them, regard them as *foreign* matters.

I have often wondered what could be the cause of the process to which I have so often alluded—Leon Vidal's photochromie—having been so much puffed up, and yet so little having been seen of it. I think I have discovered the reason at last. Recently I saw in the *Moniteur* the following criticism on copies of pictures—the products of the process:—"So much do they resemble the original that one imagines there are before us the very objects which served as patterns." These words are again reproduced in English elsewhere, yet no one who has seen the exhibits at South Kensington could for a moment attempt to describe them in such language.

I heard the other day of a very droll suggestion, viz., to print in carbon on cakes of soap. For many years past cakes of transparent soap with a pretty photograph imbedded in their centre have been sold. I have often thought them very ingenious; but the man who could develope a carbon print (which, of course, has to be done in *hot* water) on a cake of soap to pecuniary advantage would be a genius of the highest order—worthy, indeed, if it were possible, of a niche in the temple of fame as high as the one for the transcendant spirit who proposed it. I would suggest that a trio be formed by the addition of that wonderful gentleman who transferred pictures to white glycerine, as described in various periodicals a little while ago.

The *Daily News* had recently some very apt remarks on photography and public characters. What would it have said if it had seen exhibited in the shop windows of the kingdom the portraits of a series of characters who have been occupying a very prominent place in public of late—in the Balham inquest? Surely they cannot have been exhibited by permission. Propriety has been sufficiently outraged by the whole proceedings in this scandalously-conducted affair without this added injury. I read the other day of a photographer selling his business and the purchaser exhibiting as a specimen the likeness of the pretty wife of the vendor. What poetical justice it would be if the offended husband could be the one who had been trading upon the Balham nastiness!

Free Lance.

CARTOGRAPHY.

[The following article has been translated from the *Algemeen Handelsblad* newspaper, published in Amsterdam, and contributed by P. A. Mottu, to the *Philadelphia Photographer.*]

Amidst the objects exhibited at Philadelphia by the Dutch department will be found the maps of the residences of Java, executed at the topographic offices of the Department of War at the Hague. At Paris and Vienna they obtained the highest rewards, and it is very probable that they will not leave the New World without having been remarked. Captain Bass, of the staff, gave recently, at the meeting of the Dutch Geographical Society, a very interesting lecture about the manufacture of maps in general, and particularly of that of the War Department at the Hague, to which that gentleman is attached, and we will try here to give his description.

The raising of the ground, the measurements, the bringing on paper as well as the printing of the maps of this most difficult

ground, are works whose history is worthy to be known. These maps are the images of long years of struggles of intelligent men on the peaceful ground of science, and the victory has been obtained only by hard work and with great dangers. On the other side are those beautiful sheets, the consequent result of much mental labour, and the application of the last technical improvements obtained through science. They are the final effects of an invention which, if we are not mistaken, will produce quite a revolution and a great simplification in cartography. The inventor, Mr. Eckstein, technical director of the topographical offices at the Hague, makes no secret of his invention; on the contrary, he publishes it with the greatest liberality, with the minutest detail, in a small book, specially intended to be offered to the visitors of the Philadelphia Exhibition.

The maps are printed in colours. In chromolithography, as every one knows, for every shade or tint one separate stone is employed, with the exception of some colours or shades which can be obtained by the combination of two tints. This is a very dear manipulation, on account of the great quantity of stones required—sometimes fourteen or fifteen—and on account of the unavoidable wasted prints and difficulty of printing. Besides that, the light shades are liable to be indistinct. The harmonious combination of the tints depend for the greatest part on the ability of the printer. The process of Mr. Eckstein not only removes these difficulties, but facilitates also the long and dear process of engraving names and outlines. The maps of Java contain no fewer than two hundred different tints, and these and the letters of the names are all produced with four stones.

The manipulation is as follows:—The stone is first covered, in a very easy way in a dark room, with a solution of *nitras argenti*, in order to receive the photographic image of the map. The negative of the map is then applied on the stone and exposed to light, and afterwards fixed in hyposulphite of soda. Three other lithographic stones are then treated the same way with the same negative. In this manner there are four maps on four stones all precisely alike, obtained in the shortest possible time and in the cheapest manner. The stones are now covered with a thin, transparent solution of white wax, stearine and asphalt,* and when this is dry lines are drawn with a parallel machine by way of a diamond, as near as eight to twenty per millimètre; this is done in both senses of the stones. All the parts which must remain white are now covered with a solution of asphalt in turpentine, and the whole stone surrounded with a border or dike of wax. Now the stone is covered for half-a-minute with an acid which has the property to bite the stone only when it has been denuded by the point of the diamond. This acid is composed of nitric acid, water, and alcohol. After having been thoroughly washed with water the stone is sufficiently engraved for the finest tints. Then, when such fine tints are wanted for the final print, these places must be preserved with a thin coating of lithographic ink, which at the same time makes the crossed lines apt to take up the ink. As soon as the ink is dry the stone is submitted to a second biting of the same acid, but a minute longer, and then newly washed. Now cover those parts which must have this second tint with lithographic ink. In the same manner prepare the third tint by biting the stone two minutes and a-half, the fourth tint four minutes, &c., only with this difference—that by the seventh tint double the quantity of acid is required, but reduce the time to half-a-minute. After having repeated this as often as it is necessary for the map wash away all asphalt, wax, and ink with turpentine, and there is one stone ready for one colour, with all its shades. The two other stones are treated in the same way. One stone serves for the blue, one for the yellow, and the third for red. In this way can be made every possible combination. When, for instance, only one of these colours is wanted in the map—say the blue for water—cover the same places on the other stones, and leave them unbitten. When the same degree of two different tints cover each other—for instance, blue and yellow—it forms green. Is blue a shade darker it forms blue-green; if yellow predominate it forms yellowish-green; violet is formed by blue and red, and so on *ad infinitum*.

The fourth stone is employed for black lines and the names. The black lines of ways, frontiers, &c., are drawn with pen and autographical ink on the stone directly, whereby the photographed image of the map on the stone serves as guide. The letters are brought on the stone by another method, which Mr. Eckstein calls "typo-autography." He employs, therefore, a small press, with which he prints all the names wanted for the map in every size, type, and curve necessary, and this with autographical ink on thin starched paper, and places these on their respective places upon a print of the blue stone, which serves as guide, and reports them on the black stone by the ordinary lithographic process. He moistens the paper, and so removes it from the stone.

* Probably dissolved in ether or benzine.—[Note of the translator.

This is, as shortly as possible, the description of Mr. Eckstein's process. Only those can appreciate it who know something of lithography; who know the difficulty of engraving upon stone, its cost, the long time thereto employed, the difficulty to obtain brilliant colours and sharp prints; and who have seen the beautiful maps of Java and Switzerland, which are, indeed, gems of execution, and which served as models at the last exhibition of the Geographical Society of Paris. Only such persons can conceive the exactness of Mr. Versteeg's words—that the topographic office at the Hague is the pride of Netherland.

FOREIGN NOTES AND NEWS.

Unreversed Carbon Positives by Single Transfer.—The Varieties of Mossy Stains on Negatives.—Herr Hans Hartmann's Practical Directions for the Preparation of Photographic Backgrounds, &c.—Leon Vidal on Photography in Printing Ink and Polychromy.

In a letter to the *Photographische Correspondenz* Herr Jandaurek raises the question as to why so few photographers have heartily gone in for the carbon process, his own impression being that it is owing to the complications of the double transfer, which requires more time and attention than the silver process, and that if the necessity for the double transfer could be done away with the process would soon come into general use. His plan is to substitute a single transfer process, by which an unreversed picture shall be produced as by the silver process, a reversed negative being obtained in the camera by exposing the sensitive plate reversed—that is, with the unprepared film turned towards the lens. In order to do this successfully, he says, but three changes in the usual mode of procedure are required. They are—First: to see that the springs of the dark slide are arranged so that they shall not scratch the sensitive film at any portion required for the picture; in short, it is necessary to leave a margin round the negative. Secondly: the focussing glass must be reversed, and should be of the same thickness as the plates. Lastly: any silver solution that may have got upon the unsensitised side of the plate must be carefully wiped off before it is placed in the dark slide. If this last precaution be neglected the negative will be spotty and unequally lighted. All the other manipulations—such as developing and fixing—are done as usual, and an unreversed positive is obtained by single transfer quite as fine as a silver print upon albumenised paper.

In the same journal Herr Fritz Haugk suggests that, to prevent confusion, the use of the term "mossy stains" should be confined to those blemishes caused by imperceptibly-small particles of dust or of the wood of the dark slide carried by the silver bath on to the plate and allowed to dry in. For those other stains which consist of reduced silver he thinks the term "*dendriten*" (tree-like drawings) would be appropriate.

This month's *Mittheilungen* contains a long article by Herr Hans Hartmann on the preparation of photographic backgrounds. Herr Hartmann, who is a practical photographer, was formerly decorator at the Theatre Royal, Berlin, and numbers of persons having inquired of him as to the most effective way of producing artistic backgrounds, and painting the furniture and other accessories of the studio, he has thrown together the result of his long experience, for their benefit, in the paper just alluded to. He does not suppose that after reading his directions everyone will be able to paint his backgrounds for himself; but as most photographers know something, either in the capacity of retouchers or of colourists, of practical art he thinks that, with the help of a house painter, they ought at least to be able to alter or improve some of their old backgrounds, and that those who are willing to master the use of the brush and ruler will be able to make new and useful backgrounds for their pictures by using up old stretchers and paper-hangings. As some of our readers may not be indisposed to try their hand at a little amateur scene-painting for the beautification of their studios, it may not be amiss to give Herr Hartmann's directions almost in full, only premising that the necessity of having a background in harmony with the principal figure must never be lost sight of. [See next page.]

The present state of photography in France in two leading particulars will be ascertained from the following abstract of a lecture delivered by M. Leon Vidal before the *Société d'Encouragement pour l'Industrie Nationale*, the topics treated being photography in printing ink and heliochromy:—

The process of obtaining an impression on insoluble bichromated gelatine is not (says M. Vidal) an absolutely new thing. M. Poitevin, long ago, indicated the property possessed by bichromated gelatine of absorbing water in those parts not exposed to light,

while it rejected water in such portions as had been altered by light. Although these impressions on gelatine can be reproduced by a hand-press, and thus yield a number of impressions—which is important, no doubt, if compared with ordinary prints—it cannot be done in such a manner as to admit of their introduction as finished works of art in periodical publications, on account of the great expense connected with their reproduction. But prints were exhibited by him (M. Vidal) which had been produced by a cylindrical press turning out from twelve to eighteen prints per minute, and permitting, at the same time, the production of different subjects. This brings us to a stage when the text and the illustration may be combined with facility; for, the impression being produced upon polished glass, when the operation has been successful such glass is capable of yielding two thousand impressions. This, when compared with the production of photographs from negatives in the printing-frame by the usual printing process, indicates the high state to which the art has advanced.

In illustration of the foregoing a large number of specimens were exhibited, comprising reproductions from nature, from drawings, and from wood and copperplate engravings. Special attention was directed to the fact that for the production of M. Vidal's polychromic prints they were indebted to the introduction into France of cylinder presses specially constructed with a view to this process of printing.

The second part of M. Vidal's lecture was devoted to the subject of heliochromy, with the introduction of which, in a commercial form, M. Vidal's name has been so much associated, and which has now become in France a large commercial industry. He impressed upon the minds of his audience the fact that the colours were not obtained by the reflection from the rays of coloured objects—a problem that was not yet practically solved, although it was engaging the attention of several learned philosophers—but by a method discovered by himself, in which he combined luminous action with mechanical manipulation. The first polychromy which resulted from this combination had been presented in 1872 by M. Dumas to the Academy of Sciences; but since that time numerous improvements have been effected, and the process had become not only practical, but a subject which was being commercially carried out by a large industrial organisation. He (M. Vidal) spoke of the numerous applications of his process of polychromy, the colours of the reproductions being precisely similar to those of the originals from which they were taken. In conclusion he submitted for examination a large collection of portraits, works of art, photographs of jewellery, and other subjects, executed in brilliant colours, and which, he said, were now matters of everyday production.

PRACTICAL DIRECTIONS FOR THE PREPARATION OF PHOTOGRAPHIC BACKGROUNDS.

The best foundation for a background is a stretcher such as a painter uses for stretching his canvas. It must have cross-pieces at the corners, and the wood should be strong enough not to warp, as it is liable to do when the paper is stretched upon it. For a stretcher eight feet square the framework should be from three and a-half to four inches wide, and from three-quarters of an inch to an inch in thickness. If the frame can be suspended by an iron roller from a groove it may be moved easily. An arrangement by which the frame can be inclined as desired either towards or away from the light is very advantageous, as it allows of the same background producing either a light or a dark effect as is most suited to the costume of the sitter. The background may also be darkened at pleasure by furniture, curtains, or screens, by methods often described in these pages, and which cannot be too strongly commended.

Paper and linen, fine or coarse (shirting, twill, &c.), are the stuffs upon which one can paint best. Shirting is generally sent into the market with a good deal of gloss and dressing. Fasten it then upon the frame by nails only half driven in, and, having carried the first coat of paint (for which directions will be given later) over it, observe carefully whether it shrinks together. If, as is frequently the case with shirting that has been hot-pressed, it do not shrink enough, take out some of the nails, especially those at the corners, and stretch the stuff back before it gets dry. Twill is better in this respect, and on account of its roughness it is easier to paint upon it; but, on the other hand, it is heavier. If it be intended to stretch paper—say wall-paper—upon the linen foundation it is as well not to paste the latter to the edges, but, if possible, an inch or so back. This, to some extent, prevents warping. One can make excellent backgrounds for oneself by pasting upon the foundation a paper with a tasteful pattern not too harsh in colouring, and about knee-high another paper having a brown tone, and filling up the space between the wall-paper and the simulated panel with a moulding. The latter can be made more natural-looking if small semicircular sticks be stuck on so as to form squares or rectangles; and, if it be thought desirable, the ground enclosed may be filled up with painted ornaments.

I now come to the colours which are easiest to use, and which are so constituted that one can trust to their appearance to the eye without afterwards finding that one has been deceived, and that their photographed effect is really something quite different.

For size-colour chalk, ochre, umber, and Cassel brown are most suitable. The chalk, ochre, and umber must all be steeped in cold water before being mixed with the size, and the last (umber) must be left somewhat longer on account of its tendency to swell. Cassel brown is sold rubbed down in water, and is kept in a pot under water. If it be allowed to dry it becomes as hard as stone, insoluble in water, and perfectly useless; but, as mixed with chalk it gives a most beautiful warm grey tint, I use it willingly, notwithstanding. When mixed with chalk and size it may be easily and equally put on. If one wish to change the tone the ground tone can be modified by English red, chrome green, or any blue.

As a binding medium for the colour take a lukewarm, ten-per-cent. solution of size in water, or a strong, freshly-made starch paste. The quantity of size required cannot be specified exactly, but must—and therein lies the difficulty, a difficulty which hinders many from using size colours—be determined by experiment, because the quantity of size required varies according to the under-ground. Take a thin solution of size and mix it well (perferably in a mortar with a porcelain pestle) with the colour previously stirred into water, and make a trial upon the same piece of stuff and with the same brush as you intend to use afterwards. Paint upon three places near each other—on the first somewhat thickly; on the second with natural, even strokes; and on the third with the colour somewhat dry. If there be too little size the colour will come off after drying if the hand be drawn across it. If there be too much it will be streaky; more raw colour and water should be added, and then the strength must be tested again. If the mixture be right the surface will be equal. The degree of thickness is easily found by experience, and the addition of water is not likely to do much harm, especially if it be tepid.

Now paint away with regular strokes, taking care not to stop at half-dry places, or the result will certainly be streaky. If it be found, on trial, that the colour sinks too much into the stuff—as is always the case with strong linen—then, before painting, a ground layer of chalk and strong size water, which must be sifted before use, should be passed over it if a perfectly clean surface be desired. This substratum must become thoroughly dry. If it have a great deal of size it will be hard and smooth; if it have little it will drink in more of the colour which follows it, and which, consequently, requires more size. This substratum may be smoothed down, to remove any loose threads from the linen, with an evenly-sawn piece of pumice-stone, and when perfectly dry it may be rubbed down evenly with soapy water (soft soap dissolved in hot water); then an extremely equal tint may be expected when it is painted over.

If it be intended to draw lines, panels, or divisions upon the background, the measurements are set off exactly with a ruler, and the lines are best drawn with a charcoal-blackened cord, which is strained upon the given measurement, and is then taken hold of by the middle between the finger and thumb, raised out a little way from the background so that when suddenly let go it flies back, striking against the background and marking on it a perfectly straight line. If a mistake occur the charcoal can easily be removed by dusting.

Ornaments are easily stencilled on. Take a piece of paper the size and form of the panel to be decorated with an arabesque, double it together, and draw upon one half the half of the symmetrical figure, so that the middle of the latter shall correspond to the fold of the paper. Then take a needle and prick the pattern pretty closely through both folds of the paper. Now spread the paper out flat, and you have the design complete. If a square design or a rosette be wanted, fold the paper twice, taking the corner as a centre; then, by pricking, the design will be transferred to the three other quarters, and a double symmetrical figure is obtained. The design can now be traced upon the subject to be painted by dusting finely-powdered charcoal, mixed with a little gum, through the holes in the paper. The design is then gone over with a pencil. As the background is generally not very sharp a very great degree of accuracy in the details is of less importance than the proper tone; the neighbourhood of the figure does not require the same lively ornamentation as the more distant places.

Good examples (models) are to be found in the numerous journals devoted to art and manufactures, in every paper-hanging establishment, and, lastly, in the photographs of the ancient and modern *genre* pictures which abound in every style.

Patterns may also be cut out of oiled paper; but this plan is only to be recommended in the case of small ornaments. A brush with shorter and stiffer bristles is required for this, and it must be carefully drawn across the stencil paper for fear of any of the superfluous colour running down between the pattern and the ground and disturbing the cleanness of the outline.

The materials for size-colour painting are cheap. A few paint-pots, a ruler, a line, and suitable brushes—that is all. The latter are, unfortunately, not always to be had good; but, at all events, get them as large and long in the bristle as possible. Fine hair pencils are not used for size colour. The fine lines are drawn with a long, thin pencil made for the special purpose.

The advantages of size colour, its great cheapness, the equality of its washes, and, above all, the absence of gloss, adapt it for use in backgrounds in a way that is not counterbalanced by the ease with which it is injured by damp or frequent rubbing against; but when it comes to be a matter of painting furniture, pillars, balustrades, and such often-handled requisites, wax paint is preferable. It stands damp, can be as equally laid on, and is as free from gloss as the size colour. When it is used the chalk is replaced by zinc white or white lead, rubbed down with oil or finely powdered. Cassel brown must also be laid aside, and in its stead Russian sienna, burnt ochre, or burnt umber may be taken. The binding medium is equal parts of wax and mastic resin melted together in turpentine over a slow fire. The greatest care must be taken during this process, as the substances employed are very inflammable. To this mixture a small quantity of copaiba balsam may be added. If it be found necessary during use to thin yet further colours to which this mixture has been added, a weak emulsion of wax in turpentine will be found suitable.

If it be desired to paint a large surface of linen with size colour the linen must first get a foundation coat of chalk and linseed varnish, and be thoroughly dry. Upon wood, *carton-pierre*, metal, porcelain, &c., the paint can be laid on at once. By brushing lightly any degree of gloss can be conferred upon it. If the gloss be too great a single coat of turpentine is enough to render the surface perfectly dead. This method is more costly, and is not so easy for the amateur, but it gives more durable results, and allows one to work upon any sort of foundation. If the painted parts may remain glossy linseed oil can be added to the colour instead of the solution of wax. Oil colour may also be made pretty matt by a thin coating of turpentine or wax.

Very good ornaments can also be made out of vases, boxes, and similar accessories by gilding them with gold bronze mixed with gum water. A simple box with a coat of paint cleanly put on, and a pretty ornament painted upon it, has a very good effect.

Finally: upon paper backgrounds one can work with water colours. Take some cakes of sepia and dissolve them the evening before using in a sufficient quantity of water; then paint in pale washes, with a soft, flat hair pencil fixed with tin, until the desired tone be secured. When the first wash is dry it may be gone over again, only care must always be taken not to touch the half-dry places, or streakiness will be the result. While it is best to keep the frame perpendicular during the time the background is being painted with size colour, it is preferable to lay it flat while being painted in water colour, as the colour is not then so spotty.

I close these remarks with the wish that those who have not yet had practice in decorative painting would begin with small things, and they will soon overcome the difficulties, and, independently of tradesmen, be able to furnish themselves with many necessaries.

—*Mittheilungen.* HANS HARTMANN.

Our Editorial Table.

THE PRINCIPLES AND PRACTICE OF PHOTOGRAPHY FAMILIARLY EXPLAINED.

By JABEZ HUGHES, Photographer to the Queen, &c.

London: J. WERGE, 11A, Berners-street.

THIS excellent and well-known manual has now reached its eleventh edition, in which we find much that is quite new. Indeed the manual contains internal evidence of having been reconstructed to a large extent. The chapters on dry plates are confined, so far as minute description is concerned, to the Taupenôt and Ryley collodio-albumen processes—the collodio-bromide, gelatino-bromide, and other dry processes receiving a lesser although sufficient share of attention.

In a short chapter on lenses and exposure the author makes some excellent remarks, which we extract:—"The first condition of a lens is that it should give a sharp image; the next is that the definition should be soft and delicate. Fuzzy, out-of-focus definition is a miserable substitute for softness; extreme sharpness and softness go together, for the complete rendering of delicate half-tones is the very perfection of sharpness." We are glad to find such remarks coming from Mr. Hughes, because many photographers have mistakenly imagined (not so much at the present time as a few years ago) that sharpness and hardness were almost synonymous terms, and that to obtain a soft picture it was only necessary to use an imperfectly-corrected lens.

Mr. Hughes, in his chapter on the negative bath, endorses strongly Mr. A. L. Henderson's recommendation to add nitrate of baryta as a means of curing "pinholes." Besides preventing pinholes the bath in all other respects works better for the addition of the baryta, and for this reason Mr. Hughes advises that it be added when the silver bath is first made. He observes:—"This addition of baryta not only prevents the excess of iodide precipitating and forming pinholes, but it enables the bath to hold a greater quantity of iodide of silver in solution, and the full advantage of the baryta will not be obtained unless the bath is kept saturated with the iodide. Every time the bath is filtered some iodide of silver should be placed in the filter paper to be dissolved as the solution passes through. It may be difficult, theoretically, to explain why the baryta should act thus beneficially, but continued experience places the fact beyond doubt."

The reputation of Mr. Jabez Hughes as a clear-headed, sound teacher of practical photography is far too well established to require us to add any commendatory notice of the new edition of his valuable manual. If the most experienced photographer cannot fail to read it with pleasure *and* profit, how great must be its utility, then, to the tyro!

THE SCENOGRAPH MANUAL.

London: THE SCIOPTICON COMPANY, 157, Great Portland-street.

BEFORE speaking of the *Manual* our readers may not unreasonably expect us to give them some information with regard to the scenograph itself. Had a query having this bearing been put only a few weeks back we should have had to make a confession of ignorance. But with this *Manual* now before us, and having a vivid recollection of one of these instruments we recently saw in the hands of Mr. W. B. Woodbury, we are no longer in our former nescient state.

A scenograph, then, is an exceedingly light camera, having a conical or pyramidal body formed of a thin textile fabric impervious to light. It may be said to consist of a back frame for receiving the dark slides and focussing glass and a small frame for receiving the lens, both of these being connected by means of the cloth of which we have made mention. "But what of the bottom board for supporting the whole and preserving rigidity?" it may be asked. Good reader! there is none—absolutely none—in the sense in which we are in the habit of speaking of cameras. The front and back are kept distended by means of a light slip of wood above and another below, and, singular as it may appear, these confer perfect rigidity upon the instrument. Into the lower of these extensors is fitted a brass plate with ball-and-socket joint, connected with which is a short cone of brass carrying three small tubes attached to its sides, into which fit the legs of the stand, which is composed of a walking-stick comprising three tubes entering one into another. In the double dark slide of the camera the lightness and simplicity displayed are such as, we believe, have never before been exhibited in this country; and, although it is manifestly inferior in respect of solidity and workmanship to a similar slide made by one of our noted makers, still we think the foreign production now under notice may present points which no wise maker will deem unworthy of consideration. The scenograph is also adapted for taking stereoscopic pictures, the dimensions of the plate being $6\frac{1}{2} \times 4\frac{1}{4}$.

The *Scenograph Manual* is a *brochure* by Mr. W. B. Woodbury, imparting ample instructions how to use the instrument, together with many excellent hints on dry-plate photography, the result of an extended experience of the author in this direction. As we have rarely met with better or plainer directions concerning the preparation of dry plates with emulsion, *a la* Bolton, we take advantage of Mr. Woodbury's permission, and reproduce them *in extenso*:—

"*The Emulsion Process.*—To those who prefer to prepare their own plates this method offers the greatest facilities, as the plates can be coated when required; and by a simple method of transfer, used by the author in a late tour in Italy, six or a dozen glass plates will suffice to produce any number of nega-

tives; these, as taken, are transferred to a prepared paper support and the glasses used over and over again. On arrival home the pictures are re-transferred from the paper support to glass, thus saving the transport of what in a long tour might become a heavy matter. Besides the materials necessary for developing the plates, as described in the last article, the following will be necessary:—A bottle of emulsion, which must be carefully shielded from any but yellow light. When travelling, this is best kept in a wooden case, such as are sold by chemists. A small bottle, containing a weak solution of india-rubber in chloroform or benzine, with a brush inserted in the cork; half or a dozen sheets of plate glass the right size, a spirit-lamp, a small piece of sheet-iron, a few glass cloths, a piece of chamois leather, a number of sheets of transfer-paper, cut to size, and a slip of india-rubber let into a wooden frame, known as a 'squeegee.'"

"*Preparation of the Plates.*—If done in the daytime the room should be made perfectly dark, and a candle with the yellow shield employed, the same as at night. The plates, having been well washed with a piece of flannel in water, are dried on a clean cloth, and then polished with the wash-leather, both cloths and leather being kept strictly for this purpose, and scrupulously clean. The plate is then taken by the corner, or held with the holder, and the brush, charged with the india-rubber solution, passed along each edge. This dries instantaneously, and the plate is ready to receive the coating of emulsion. The spirit-lamp (that known as the "rechaud" is best) is lighted, and a piece of sheet-iron placed over it. The plate is now coated with the emulsion, which requires some care to prevent streaks, practice alone enabling the operator to obtain a perfectly even coating. After allowing about half-a-minute for the film to set, it is held over the heated sheet of iron at such a distance that it will not get too hot, and will be dry in two or three minutes. It is then placed in the slide, and is ready for exposure; but as an additional precaution it may have a second band of india-rubber run round it. This makes the film secure from leaving the glass; also, from its greasy nature, prevents the after-solutions used in developing from running over the edge and staining the fingers. It is best to have two emulsion bottles—one to receive the surplus solution, which, when full, may be filtered back into the other. The author, when away from home, employs for this purpose a very simple filter made of a piece of note-paper twisted into a conical form, and held in that position by a pin, a piece of clean cotton being lightly inserted. When done with, the funnel can be thrown away. In time the emulsion will get too thick; a sufficient quantity of ether two parts, and alcohol one part, should then be added to bring it to its original state. This should be done just before filtering. The development of the emulsion plates being substantially the same as for the prepared dry plates, need not be again described."

"*Transferring the Emulsion Negatives to Paper.*—Lay the negative, when dry, in a basin of water, and at the same time a piece of the transfer-paper with the prepared side downwards; in half-a-minute lift up the glass and paper together, and lay them on a flat surface; remove the surplus water by rubbing over with the squeegee. In the course of half-an-hour (and while still damp), on applying a knife to one corner the paper will come away, taking with it the negative film. The glass can then be washed ready for use again. When dry the negatives should be kept in a book of soft paper occupying very little space, and may again be attached to plates of glass on the return home. This is done as follows:—Make a solution of gelatine of the strength of one ounce to ten of water, and add about three grains of chrome alum, dissolve and filter. Coat glasses of same size as the original ones the negatives were taken on. When dry proceed as before, laying the glass and the picture on the paper in a basin of water, withdrawing them after a space of half-a-minute has elapsed, and squeezing the surplus water away; allow to dry thoroughly, then place in a dish of hot water; in a few minutes the paper will come away, leaving the negative attached to the glass as firmly as if it had never been removed. The author can confidently recommend this simple method of doing away with a weight of glass, having first tried it in Italy early this year without having had a single failure. This can rarely be said of any new method tried for the first time, and is a real proof of the thorough practicability of the method employed."

The manual is illustrated by a charming cabinet view, taken by the scenograph and printed by the Woodbury process.

Correspondence.

PICTORIAL DESIGNS.

To the Editors.

Gentlemen,—Under the heading of *Pictorial Designs* I find that Mr. Warwick Brooks, of Manchester, has sent you several portraits "in a style which will commend itself to the favourable notice of many." It is to be regretted that Mr. Brooks did not see fit to state to whom the idea belongs, because he was well aware that the friend who communicated it to him was preparing some pictures for the papers. He had no idea of patenting, but at the same time it does not follow that he should be deprived of the meed of praise which is due to him.

I have written to Mr. G. Higginson, of Southport—who is the gentleman I refer to—requesting him to send you one of these pictures; and that you may rest satisfied as to the accuracy of the foregoing statement I may tell you that the portrait is that of Mr. Brooks himself, taken by Mr. Higginson at the time he acquainted him with his novel idea.

Trusting to your well-known impartiality, I have no doubt that in this case, as in many others, you will "render unto Cæsar the things which are Cæsar's."—I am, yours, &c., C. Ferranti.

Liverpool, August 12, 1876.

THE EDINBURGH MEDAL AWARDS.

To the Editors.

Gentlemen,—In your last number I find that Mr. Bashford states that "Mr. Williamson is from home, and is consequently unable to reply to the letter of Mr. Neilson."

It is not curious that a gentleman should sometimes be "from home;" but it is curious that, having had three weeks before him in a land of post-offices, Mr. Williamson is still "unable to reply" to my letter. However, people should be thankful for small mercies. Mr. Bashford informs an anxious public that the "reply" is coming. Mr. Bashford may be a prophet, for aught I know; but it would have been more decent if he had not tried to produce an impression that a satisfactory reply can be given to the facts I stated, when there is no prospect of such a reply cheering the eyes of the "printer's devil."

If the reply is coming the "dodge" was unnecessary; if the reply is not coming the "dodge" is——what d'ye call it?—I am, yours, &c.,

Edinburgh, August 14, 1876. W. Neilson.

Poisoning by Cyanide of Potassium.—In the *Lancet* of last week (August 12) a very remarkable case of poisoning by cyanide of potassium and of recovery from it is given. It took place at Liverpool. The patient—a man of thirty-five years of age, an umbrella maker, who used this material for silvering purposes—took the poison a few minutes past two in the afternoon, in a fit of passion, as he stated, being drunk at the time with whiskey. He says that he put the piece of cyanide into his mouth, chewed it, and washed it down with a drink of tea. After taking it he sat down, then got up and walked to the door—a distance of two or three yards—when he fell down unconscious. His wife gave him some salt and water, which caused him to vomit a little. He was then taken to the Royal Infirmary, where he arrived at 2.40 p.m. The stomach pump was used, and artificial respiration was persevered in for upwards of two hours. Tracheotomy was performed to remove what turned out to be a mass of thick mucus blocking up the trachea and stopping respiration. The piece of cyanide swallowed is understood to have weighed between fifty and sixty grains. At the end of four days the patient left the institution feeling quite well. The details of the treatment would be out of place here, but may be seen by reference to the *Lancet*, where they are given in full.

A Word on Transparencies and Enlargements.—The great drawback heretofore felt in making transparencies and enlarged negatives therefrom has been the "fuzziness" or blurred appearance of the resulting picture. Where a transparency is made in direct contact with the negative by any of the known dry-plate processes (if contact be perfect), no blurring will be perceptible, and the resulting transparency will be as sharp as the original negative. Now take this transparency and use it for an enlarged negative by any means I have seen recommended; namely, place in front of your object-lens and pass the light through it, either direct from the sky or reflected from a white screen, and in proportion to the diameters will be the blurring of your resulting negative. I have found that all this can be avoided by placing in front of the negative you wish to make transparencies from, either for the lantern or duplicate or enlarged negative, first next to the window, or, better still, clear daylight, a porcelain plate (a thin one); next to this two or even three thicknesses of (finely ground) ground glass, ground side out. Inside of this place your negative, collodion side to the object glass; focus with full, open tube, and, before exposing the plate, insert small stop. The result will be a transparency or negative free from all blurring, sharp and clear as the original negative. Now place this in place of the original negative, and proceed to make your enlarged negative. I have never seen this idea mentioned by anyone, but all who try it will at once be convinced of the great advantage to be gained by the use of porcelain and ground glass as already mentioned.—Mr. A. Hesler, in the *Philadelphia Photographer*.

A Whisper to Country Artists.—Any decline in business, when your superior work cannot possibly be the cause, must be traced to your interior management. The treatment of customers, and their disappointment in not getting their pictures after one or more promises, will produce an ill feeling, which will spread amongst their friends, with an aversion to your place. If you feel perfectly free from feeling like *mea culpa, mea maxima culpa* in these two points, then, and only then, you may console yourself with the idea that "business is dull everywhere;" if not, meditate on the following illustration of the two causes above;—1. *The Treatment of Customers.*—(Politeness to all is, of

course, understood). The business being once well established as to the style of work and the price therefor, &c., no preference must be given to any person as regards social rank, personal charms, friendship, &c.; nothing but actual present engagement or appointment ought to prevent the business man from attending to the applicant, whoever and whatever he or she is, promptly and fully to the aim and end of his business. To let go or send off a caller of seeming inferior appearance (so often very deceptive) on some pretext may, for aught you know, be the mysterious reason for your neighbour's increase of business and the decline of your own.—2. *Disappointment After Promises.*— Customers who are capable of appreciating the superiority of your work are generally also capable of judging how many "clear days" it will take to finish their pictures, and they will not call for them before allowing you plenty of time. This is one class. The other class (and by far the most common in country business) care not so much about your "first-class work only" as for getting their pictures just when you promised them; they will pay you just the same as the other class, and gladly, if you are ready with the pictures at their call, and thank you besides for your obliging promptness. But when the customer comes in, and you say—"No, not yet; I am sorry, the bad weather, you know," &c., he or she will recollect the weather; and say—"Well; I will come again." The weather was not so very bad; but if, on the second or third call, no pictures come forward yet, you may fairly expect to be told, or get a note to the effect, that they do not care for the pictures, but will go somewhere else, where they can get them sooner if not better. When that disappointed customer has gone you will feel neither good or bad. You can feel good only when natural or true causes prevented your keeping the promise. You will feel bad when your own neglect or procrastination caused the disappointment, and then you will try to smother your conscience by cursing "that impatient fool." And now again you have lost, for aught you know, not only this customer, but all his or her hosts of friends, whom you might have secured by *promptness*, *impartiality*, and *politeness*, the great virtues and secrets of success in business.—Cosmos, in *Anthony's Photographic Bulletin.*

EXCHANGE COLUMN.

No charge is made for inserting these announcements; but in no case do we insert any article merely *offered for sale*, that being done at the small cost of one shilling in our advertising pages. This portion of our columns is devoted to exchanges only. It is imperative that the name of the person proposing the exchange be given (although not necessarily for publication, if a *nom de plume* be thought desirable), otherwise the notice will not appear.

Spanish mahogany pocket camera, with changing box, offered for a small, nice, water-tight bath, or offers.—Address, A. Nock, 18, William-street, Lozells, Birmingham.

ANSWERS TO CORRESPONDENTS.

Photographs Registered—

W. Brookes, Manchester —*Five Pictorial Designs for Photographs.*

P. Jones, Wrexham.—*Photograph from Painting of the late Rev. John Williams.*

W. Usherwood, Dorking.—*View of Review of 2nd Army Corps in the Marquis of Blandford's Park.*

☞ *Correspondents should never write on both sides of the paper.*

*** We regret that we are compelled to keep over till next week several reviews, including notices of *Landscape Scenery in Australia;* Mr. Alfred Dawson's *English Landscape Art;* a new edition of Mr. Ackland's *Hints on Spectacles;* and some *Views on the Continent* by Mr. W. B. Woodbury.

A. B. Y.—See an article on the subject of backgrounds, by Hans Hartmann, in our present number.

A. B. C.—Mr. Sutton's treatise is sold at one shilling, and may be obtained at the Publishing Office of this Journal.

E. C. S. P.—A lens having an equivalent focus of twenty-six inches will produce an image of the dimensions you require.

X. Y. Z.—The requisite amount of intensity may be imparted to the negative by the application of a very weak solution of chloride of gold.

Rev. R. B.—Mix together one part of hard white spirit varnish and two parts of alcohol, and the resulting mixture will be a good and serviceable varnish.

G. A. W.—After having obtained the electrotype in copper give the face a very thin coating of iron, by which it will yield a far greater number of impressions.

Adolph Barker.—Certainly; plates may be prepared in such a way as to develope themselves. Try a preservative containing liberal proportions of pyrogallic acid and glycerine.

T. Kelly.—Your friend cannot know much concerning the use of a diaphragm, otherwise he would not have recommended you to place it close up against the lens. Remove it to a distance of two and a-half inches, and then take a picture. This will immediately render apparent which position is the correct one.

R. M. B.—Sulphocyanide of ammonium is not only more expensive than hyposulphite of soda, but, what is of greater importance, it does not fix the prints properly. See an article in our volume for last year entitled, *A Fixing Agent that Will Not Fix.*

Major Terry.—We can offer you the most positive assurance that surface stains on the negative are *not* caused by the use of collodion made from methylated solvents; for we have obtained them when operating with collodion made of the purest materials obtainable.

A. K. B. (Bedford).—Add a few drops of an alcoholic solution of curcumine to the collodion. This solution may be easily prepared by placing a teaspoonful of turmeric in a two-ounce bottle, and then nearly filling the bottle with alcohol, which will rapidly extract the colouring matter.

Johannes Möller (New Bond-street).—Our correspondent, referring to certain photographs on opal glass or porcelain—regarding which an article appeared in our issue of last week containing an eulogium on the painting of them—informs us that several of these photographs were painted by him.

John Hinley.—The following are a few of the methods by which the presence of ammonia is known, namely, by its odour; by its turning vegetable blues green, and vegetable yellows brown; by its fumes when brought into contact with those of acetic or hydrochloric acid; and by the deep blue tint it imparts to the salts of copper.

Amateur (Brighton).—The lens marked "No. 2" will be the most useful, because it will not only cover the plate well in its complete form, giving a picture of a moderately wide angle, but it may be employed to produce a picture on a greatly-enlarged scale, by removing the front lens from the tube and using the back lens alone, with a stop, of course.

H. M. M.—Try the following:—Mix four parts of prepared chalk with one part of carbonate of magnesia, and beat it into a thick paste with a little gum water. Next, shape small portions of this into the desired form, and take in an oven. Although this has been proposed as a substitute for lime balls, we give it merely as a suggestion, being unable to express any opinion as to its efficiency.

M. B. O.—1. Make a cell having parallel sides, selecting for this purpose plates of glass of the very finest quality. Fill this with an ammoniacal solution of copper and place it in front of the lens. This is the only expedient by which the chemical rays can be admitted to the interior of the box in the way that you suggest—2. Three lenses must be employed, as it is quite impossible to obtain correction with a less number.

W. T. S.—In the daguerreotype process both the iodide and the bromide of silver were formed by the direct action of iodine and bromine upon the metallic plate. The iodine was strewn upon the bottom of a flat vessel, and sometimes a little cotton wool was placed over the iodine to ensure the fumes rising evenly. The bromine was sometimes used when mixed with water, but more commonly it was employed after having been mixed with lime.

Old Subscriber.—Prints toned by the "old hypo." method and which have become faded may, in most instances, be restored by being immersed in a bath of chloride of mercury (corrosive sublimate). It must, however, be remembered that this does not apply to prints which have been toned with gold. It is a singular fact in connection with "old hypo." prints which have been restored by the mercurial treatment, that not only are they much more beautiful than they originally were, but they do not again fade. At anyrate, we have some which were restored in the above manner in 1865, and they still possess beauty and brilliancy.

Dry Plates (Philadelphia).—Our correspondent, referring to a suggestion we made in "Answers to Correspondents" relative to the use of India-rubber bands as a means for packing dry plates, says:—"I have used them in the way described, and in every case they have caused a broad band of insensitiveness across the end of the plate where the india-rubber touched the sensitive film. In one case, when the package of plates (beer and albumen), remained unopened five or six days, the band of insensitiveness was an inch and a-half wide. Others on this side have had similar experience with india-rubber bands, and have thrown them aside as worse than useless for that purpose."

Received.—John White.

☞ Editorial Communications should be addressed to "THE EDITORS"—Advertisements and Business Letters to "THE PUBLISHER"—at the Offices, 2, York Street, Covent Garden, London, W.C.

METEOROLOGICAL REPORT,

For the Week ending August 16, 1876.

Observations taken at 406, Strand, by J. H. Steward, Optician.

These Observations are Taken at 8 a.m.

August.	Bar.	Wind.	Wet Bulb.	Dry Bulb.	Max. Tem.	Min. Tem.	Remarks
10	30·298	NE	59	65	76	60	Bright
11	30·378	E	59	64	78	54	Bright
12	30·238	SE	63	69	84	56	Bright
14	29·986	WSW	68	73	93·5	64	Bright
15	30·058	W	68	75	92	65	Bright
16	30·058	SE	67	72	84	67	Dull

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THE BRITISH JOURNAL OF PHOTOGRAPHY.

No. 851. Vol. XXIII.—AUGUST 25, 1876.

THE ENAMELLING OR GLAZING OF PHOTOGRAPHS.

That the enamelling of paper prints would, in the case of a certain class of photographs, eventually become popular we never entertained any doubt. The prognostications in which we ventured to indulge at the time of its introduction have been more than warranted by the result, numerous works, especially portraits of small dimensions, being every day issued after having been finished by the external glazing of enamel. We learn with not a little astonishment that the process of enamelling prints is being taught to the lesser experienced of our professional brethren as if it were a somewhat mysterious operation, while the fact is patent that everything known in connection with the enamelling of prints has been from time to time brought under the notice of the readers of The British Journal of Photography, in whose columns the details of the process were first published.

As perhaps some of our more recent readers may be inadequately acquainted with this "mystery" we purpose giving in the present article such directions as will enable the most inexperienced, if endowed with a moderate amount of intelligence, to attain to a perfect measure of success in what is really a simple operation.

As a matter of history we may state that the method of enamelling now in general use was introduced in 1864. In May of that year Mr. J. G. Tunny exhibited the first enamelled prints we had seen, the surface of which was impervious to the action of water. In the following August Mr. Rollason obtained a patent for a method by which were produced effects similar to those of Mr. Tunny, and, while the patent was yet quite inaccessible to the public, Mr. Tunny published in our pages the details of his method, which eventually proved to be precisely the process that had been patented. The latter, indeed, differs in no essential respect from the process in use at the present time, and which when first introduced was admitted to be a great improvement on the plan that had to a very limited extent been previously employed. This latter method was first practised in France, and consisted in glazing the pictures with gelatine only. We need scarcely say that collodion is now the medium by which glazing is effected, gelatine being still in use, but only as a means of securely attaching the collodion pellicle to the pictures.

The *French* mode of enamelling has been much spoken of recently, from which it might be inferred that such method differed in some striking respect from the English system; and, as the northern proverb says that "Far awa' birds have fair feathers," it might not unreasonably be imagined that the French mode of enamelling surpassed that long adopted by practitioners in our own country. Having had considerable experience with both we shall describe each in its turn, pointing out the peculiarities in the process by which the respective nationalities are distinguished.

The first thing to be done is to procure, as stock-in-trade, one or more smooth, thick plates of glass. In making a selection avoid those having surface defects, such defects being reproduced on the picture. A plate of this description having been very carefully cleaned and made quite dry a thin film of wax is applied. This may be done either by warming the plate and rubbing over it a piece of white wax, or by dissolving the wax in ether or any other convenient solvent and pouring a little upon the surface of the plate, distributing it with a clean cloth. Such an amount of friction must be applied as will effect the removal of the superfluous wax. It should be borne in mind that the more perfectly the wax is removed—short, however, of its total removal—the better will be found to be the polish of the finished print at a subsequent stage. The method adopted by several French operators of preparing the surface in order to prevent the adhesion of the collodion is that which, so far as we recollect, was first recommended by Mr. W. B. Woodbury, namely, sprinkling a little finely-powdered talc or French chalk over the surface and thoroughly rubbing it all over the plate.

The surface of the glass plate having been prepared in the foregoing manner a coating of plain collodion is next given. The collodion used for this purpose should be of a hard, tough, skinny character. Upon this collodion coating is applied another of gelatine. This latter is composed of an ounce of gelatine placed in twelve ounces of water. Allow the gelatine to soak in the water for an hour or two, and then immerse the vessel containing them in another of hot water, by which the gelatine will rapidly become liquefied. If the gelatine be of an opaque kind it is advisable to stir up with it, when at a temperature of 80° or 90° Fah., a little albumen, and then subject the whole to such a degree of heat as will coagulate the albumen, which will then separate from the gelatine, leaving the latter very limpid and pure. To effect this separation it is often necessary to have recourse to straining through a piece of muslin.

The original suggestion of Mr. Tunny to coat plates of large dimensions so as to lay down upon one of them, and thus glaze, a number of prints at one operation is universally acted upon at the present period by all who carry out the process on a large scale. Of course we need scarcely observe that the larger the plates the thicker and stronger must they be proportionately. When the process was first published, in 1864, we prepared two or three dozen plates and kept them in a plate-box ready for use when occasion demanded. This plan answers well, and obviates the necessity of preparing one or more plates every time the process of enamelling prints is to be gone through.

A method practised in Paris with success is to mix a little glycerine with the gelatine. The proportions adopted by one successful operator are—

Gelatine	1 ounce.
Glycerine	2 drachms.
Water	10 ounces.

The prints to be glazed are plunged into water for about half-a-minute, and, after having the superfluous moisture removed by blotting-paper, a little of the warm gelatine solution is applied to the faces by brushing it well over every portion of the surface. Allow the picture to become dry. Next pass a wet sponge over the gelatinised surface of the glass plate until it is all evenly wetted, and then immerse the print in water for a few seconds. Now having placed the print, face down, upon the glass plate, press it in very intimate contact with the surface by means of a squeegee or other similar contrivance, taking great care that no air-bubbles be left. This is very easily seen by turning over the plate and looking at the print through the glass. When the whole of the prints have

been treated in this manner the plate is placed aside for ten or twelve hours to dry. The drying may be facilitated by the application of a very gentle heat and a current of air. A sharp knife must next be run round the margins of the prints, and by lifting up one corner the pictures will come away from the glass with the greatest facility, their surfaces being very fine and glossy.

We know of several operators who, after coating the surface of the glass with gelatine, do not allow it to become quite dry, but only to set well, afterwards immersing it in water; and they apply the prints to the glass after giving the former a coating of gelatine, and without allowing the latter time to set. We have in our possession prints enamelled by both methods, but are unable to discover any difference between them.

COLLODION.

Although the time has happily long since passed away when photographers, or those, at least, who knew how to do good work, were wont to charge their want of success to the nature or defects of the tools or material with which they were supplied, and it is now almost universally understood that the production of high-class results is more dependent on the brain that guides than on the matter that is guided; it is, nevertheless, desirable that every operator should, as far as possible, or, at least, as far as practicable, be acquainted with the composition of the substances he employs. We presume it is hardly to be expected, however desirable it might be, that every good photographer should also be a good chemist, although it is undoubtedly true that the more thoroughly he is acquainted with that branch of science the more intelligently will his operations be carried on, and the greater will be the pleasure he derives from them; but we are entitled to expect that everyone shall be acquainted with the nature and properties of the limited number of articles which he daily employs, and with the changes and decompositions which they intentionally are made to undergo, or to which they are incidentally liable.

Now, with regard to most of the material in general use, it may be taken for granted that the average photographer is pretty well acquainted with all that is requisite to be known about it, as the various solutions are made by himself according to formulæ of his own, or with the working of which he is familiar. The important item, collodion, is, however, an exception to this rule—partly in consequence of the trouble and difficulty of making a really good and uniform article in small quantities, but more especially from the fact that most of the ordinary commercial samples are decidedly of excellent quality. Although a knowledge of the composition of the collodion with which a photographer is in the habit of working is not by any means essential to his success, the information would, no doubt, in some instances be useful; and as successful makers are not likely to publish their formulæ—although we do not think they would suffer by printing them on the labels—we wish to remind our readers of what we have several times already said, that they can, without much knowledge of chemical manipulations, readily obtain the information for themselves.

Struck with the observation we have frequently heard, to the effect that such and such a collodion was *supposed* to be salted with ammonium salts only, or with ammonium and cadmium, &c., we some time ago resolved to undertake a series of experiments with a view to ascertain something of the iodides and bromides contained in the ordinary commercial samples of collodion. For this purpose we collected nearly a dozen samples by as many more or less well-known makers, and proceeded to examine them somewhat after the following manner:—To a measured quantity of collodion was added an equal quantity of distilled water, and the whole well shaken and allowed to stand till the precipitated cotton subsided. A little more water was then added to ensure the complete precipitation of the pyroxyline, and the whole poured on a weighed filter. After all the liquid had passed through, the filter and its contents were washed by passing distilled water through until a drop allowed to fall on a drop of a solution of nitrate of silver on a slip of glass produced no reaction. The filter and its contents were then dried at a temperature not exceeding 212° F. and weighed, the product, less the weight of the filter, being approximately that of the pyroxyline in the quantity of collodion experimented on. The filtered liquid, including the water used in washing the precipitate, was then gently evaporated to dryness in a weighed dish, and the weight, less that of the dish, was taken as tolerably near that of the actual quantity of iodides and bromides in the collodion. Salts of potassium are, we believe, now rarely used in collodion, but to roughly ascertain whether they were present we dipped a perfectly-clean platinum wire in the solution before the water had quite evaporated and placed it in the flame of a Bunsen burner. On examining the flame through a piece of cobalt blue glass there was no appearance of the characteristic purple light of potassium; the object in using the blue glass being, of course, to absorb the sodium flame, which is always more or less present, although there may have been no salt of that metal used in salting the collodion. Sodium, lithium, and magnesium were also looked for, but as none were found in either of the samples we shall not occupy the limited space at our disposal with an account of the method of testing for those bodies, but confine our remarks to those actually found, viz., ammonium and cadmium.

A small quantity of the dried powder is to be mixed with an equal quantity of caustic potash and triturated in a small mortar, when, if ammonia be present, it will be indicated by the characteristic smell of that body. Another portion should be dissolved in a little water, and ammonium sulphide added so long as a yellow precipitate continues to be formed. This is cadmium sulphide, and the washed and dried precipitate from a weighed quantity of the original powder will indicate the actual quantity of cadmium present.

The detection of iodine and bromine, or, rather, of hydriodic and hydrobromic acids, is equally simple. To a portion of the powder, or original residue, dissolved in water, add a solution of palladium protochloride, so long as a dark-coloured precipitate continues to be formed. This palladium proto-iodide, if washed and dried, will give the quantity of iodine, and a solution of silver nitrate added to the filtrate, by the formation of silver bromide, will enable the experimentalist to estimate the quantity of bromine present.

Working in this way we found that the average quantity of pyroxyline in the samples of collodion examined was 5·40 grains, and that some samples contained as much as seven grains, and others as little as four grains, in the ounce. We may add also that those that contained the larger quantities were generally more fluid, and mechanically better than those that contained the smaller quantities. This is just in keeping with previous observations that the cotton best suited for general photographic work is that which will admit of the greatest quantity being used to give the suitable thickness. In connection with this it may be of use to say that we find that the age of the collodion has a considerable influence on the loss of pyroxyline when estimated in the way indicated. We had a sample that had been iodised for about fifteen months, and which was known to contain six grains to the ounce. This, on being examined, gave a result of 4·25, while a sample made with the same pyroxyline, but which was only a few days old, yielded 5·80 grains. This would seem to indicate that the products of the oxidation which the ether, and probably the alcohol also, undergo, combine in some way with the pyroxyline, and give rise to the formation of a compound more or less soluble in water.

The whole of the samples, with one exception, contained both cadmium and ammonium salts, and in quantity averaging 4·90 grains per ounce—one having as much as six and a-half grains, and one a little less than three. As in the bath all seemed fully iodised, while none were so much so as to cause the bursting out on the lower end of the plate, so well-known in over-salted samples, the actual fact may be inferred—that is, that the higher-salted samples were mainly cadmium, and the lower mainly ammonium, collodions, 145 grains of ammonium iodide containing as much iodine as 366 grains of cadmium iodide. The exception above mentioned was simply an ammonium collodion, containing three grains of iodide and one of bromide. It was sold as "extra rapid," and was said to deserve the title for some time after iodising, but did not retain its good qualities for more than a fortnight.

On the whole, we are disposed to think, after many experiments with the various samples placed at our disposal, that a collodion containing ammonium salts, with just sufficient cadmium to keep it in good working order—as a very little cadmium really seems to have that effect—will be found the best for general work; and, although the requirements of the photographer are so varied that a hard and fast line in formulæ cannot well be drawn, we believe that for general purposes three grains of ammonium iodide, one grain of cadmium iodide, and one grain of ammonium bromide would give excellent results.

THE PRACTICAL APPLICATION OF ALKALINE DEVELOPMENT.

But a few years ago the application of alkaline development was confined almost exclusively to two or three dry processes, and even then was only used by those who possessed sufficient courage to venture beyond the bounds of old-fashioned routine; it was, indeed, looked upon by the great mass of photographers as a method too complicated in its manipulations and uncertain in its results to be worthy of general adoption except by experts. This was, perhaps, scarcely to be wondered at considering the difference between this system and any of those previously in use; and the proverbial reluctance evinced by photographers to the adoption of any new thing was never more plainly exhibited than in connection with ammonia development.

Upwards of a dozen years' experience, however, has had the effect of proving to the most conservative minds that the new system is absolutely essential to the production of the highest class of dry-plate work, whether the quality of the work be measured by rapidity of exposure or general perfection of results. It is remarkable, nevertheless, that in spite of the great amount of attention which has recently been devoted to the subject, both in its practical and thereotical phases, that one of its chief advantages is almost entirely ignored; we allude to the immense power afforded by varying the proportions of the constituents of the developer in order to produce any desired result or to suit the special peculiarities of each particular process. In saying this we by no means overlook the fact that different writers recommend developers of widely-different strengths and variable proportions; but these formulæ are generally put forward as *the* best under all circumstances, while we hold that there is no *best* formula for indiscriminate use under every condition, but that a developer which may work to perfection with a particular process, a certain class of subjects, and a given state of temperature and illumination, may, and will in all probability, produce an inferior result if the conditions be changed. We should like, not only in this but in other branches of photography, to see the slavish adherence to formulæ give place to the exercise of greater judgment.

To illustrate our meaning we will suppose that a photographer has a number of plates to develope, including every variety of subject—from well-lighted, open landscapes to dimly-illuminated interiors. Now the chances are that the only variation made in the development would consist in the length of time required to bring out the details and to reach printing density. The same strength of pyro. solution and the same number of drops of bromide and ammonia are probably used in each case to commence the development, the whole of the work being thrown upon the subsequent operations; whereas, perhaps, the most important effect is produced by the first application. It has, indeed, been said that the first developer applied gives the character to the subsequent image—a statement which, though true in one sense, scarcely expresses the strict meaning it is intended to convey.

It may be inferred that every operator who is accustomed to working a particular form of dry plate understands the peculiarities of that particular process, and has learnt by experience the best strength of developer to apply under certain conditions of light and subject; hence such formula is accepted and used as the best for the purpose. But it will happen frequently that when working under different circumstances failures occur which are probably set down to some defect in the plates, when really they are due to improper development. Let a number of plates prepared by different processes be exposed under as nearly as possible similar conditions, and developed with solutions of equal strength, and the results will testify abundantly to the truth of our statement; hence it is evidently unwise to fix one developing formula to suit every class of plate.

Very much has been written of the latitude in exposure allowable when alkaline development is used—exposures of from thirty seconds to ten minutes or more having been said to produce negatives of good quality. An examination of such a series of negatives might possibly demonstrate that each particular plate was technically good; but it does not follow that all must be equal in quality, or that each result is the best that could be possibly attained. On the contrary, the experiment is only an argument in favour of the great power exercised by the developer, and the individual results can only be regarded as the best obtainable under the special circumstances of exposure.

Let it not be imagined that because such latitude exists in the matter of exposure that the latter is an element of little importance. Examine a series of negatives such as we have spoken of and it will be found that, though each may give a satisfactory print, there will be one or more midway between the two extremes of exposure which will carry with them an indescribable *something*, giving the idea of greater perfection. This "something" has been called "tone," and is supposed to be due to the correct adjustment of the exposure to the subject. In the same manner we may suppose it possible to adjust the development to the exposure, so as to produce the best possible result; and by combining the two adjustments we secure the peculiar charm which attaches to a perfect photograph, and which it is difficult to trace to any special excellence in manipulation or technical qualities, but which we must be content to recognise under the name of "tone."

Though from what we have said it will be understood that we wish to impress the fact upon the minds of our readers that results of the highest excellence are only to be obtained by a proper adjustment of both exposure and development to the particular subject, it is not to be supposed that we ignore the power we possess in the alkaline developer of so modifying the developing action as to produce an effect impossible of attainment with any other form unless the exposure be strictly correct, and it is with this branch of the subject we wish more particularly to deal. As we have already remarked, it is impossible to lay down a course of manipulation equally suitable to every process, so we shall deal with the one we generally employ, adding a few remarks upon the difference in behaviour of other processes, from which our readers will, no doubt, be able to form their own course of action.

First we may state that the solutions we employ consist of—1. Pyrogallic acid sixty grains, pure absolute alcohol one ounce. 2. Fresh carbonate of ammonia eighty grains, water one ounce. 3. Bromide of potassium ten grains, water one ounce. We prefer the alcoholic solution of pyro., because it is convenient, saves a great deal of weighing, and keeps good for a considerable time. The strength mentioned above will be found very convenient and save much calculation, as one minim added to each drachm of water forms a one-grain solution. Not its least recommendation is that it readily permits the addition, during development, of any measured quantity of pyro. We prefer the carbonate of ammonia to the diluted liquor, on account of its more regular action, and also because a much larger quantity may be used without dissolving the image or rendering it thin and transparent. The bromide solution requires no comment. The plates we employ for general purposes are prepared by the emulsion method with a very slight excess of bromide, and are subjected to the action of an organifier consisting of tannin, gallic acid, or coffee.

The different classes of subjects usually met with may be classed as follows:—Open landscapes with contrasts; the same without contrast; dimly-lighted subjects and interiors. These may, of course, be subdivided to any extent, but the above will be quite sufficient for our purpose. We will first take an ordinary open landscape including distance, foreground, and foliage well lighted by direct sunshine. This forms, perhaps, the easiest subject that can be chosen, provided the exposure be at least approximately correct.

The too general mistake is to under-expose in such cases; but it should be borne in mind that the proper plan is to expose for the shadows. This, of course, has a tendency to lead to over-exposure of the high lights and distances, and here comes in the necessity for the exercise of skill and judgment in development.

The object to be aimed at in such a case as the above is to get out the detail in the shadows, while, at the same time, the lights and distance are restrained as much as possible. The restraining action cannot be performed by means of bromide, for that acts nearly uniformly upon lights and shadows; it must depend upon the strength and proportion of the ammonia and pyro. The action of these two substances appears to be distinct, the ammonia increasing the vigour of the developing action, while the pyro. gives density to the deposit. This may appear an anomalous statement, when it is considered that successive additions of the former are ordinarily made to work up the density of the image; but this, it will be remembered, is in the presence of a solution already strong in pyro. A strong solution of ammonia containing but little pyro. is incapable of giving density, while if the conditions be reversed a clear image of considerable vigour is developed, but very slowly.

Bearing this in mind, we proceed to the development of plate number one. In order to bring out the details, we employ a moderately strong (for this class of plate) dose of ammonia, say two or three drops of the saturated solution, together with one drop of bromide solution to each drachm of developer. The pyro. must be added more sparingly, not more than one drop per drachm, in order to keep the high lights thin, and allow the shadows, as it were, to creep up to them. As soon as the shadows appear to be in harmony with the rest of the picture the developer is to be gradually strengthened, special care being taken not to add the ingredients too quickly so as to fill up or "thicken" the high lights. It is of the greatest importance that a liberal dose of bromide be used during intensification, but the details should be well out before it is added.

As a type of the second class of subject we may take an open landscape consisting of objects in nearly the same plane and including no masses of heavy foliage capable of casting decided shadows. If sunshine be absent the natural flatness of the picture will be, of course, increased. Our object here is to make contrast, or, rather, to heighten what little already exists. In order to do this we use a stronger solution of ammonia with a larger proportion of bromide, and the quantity of pyro. may be slightly increased. As soon as the details begin to appear wash the plate in order to stop development. Make a fresh solution, containing say three drops of pyro. and four of bromide in each drachm, and flow it on the plate before adding the ammonia, after which the latter may be added in about double the proportion previously employed. The effect of washing off, as well as the *sudden* increase of the strength of the developer, tend to the production of brilliancy or, if carried too far, of hardness, and if used with care will produce very satisfactory results. If the first dose fail to produce a sufficient effect the same course may be repeated, washing the plate and applying a fresh solution, though in such case we prefer to resort to silver intensification.

Next we come to the class including such dimly-lighted subjects as interiors, mountain gorges, or forest scenes. If uniformly dim the difficulty is not great, and depends chiefly upon the exposure, which must be sufficient to impress the details in the darkest portions. After developing sufficiently to show the detail the aim should be to secure as much contrast as possible, as in the preceding case. If, however, the general obscurity of the subject be broken by local masses of light, as the sun pouring through the windows of a building or glancing through the interstices of a mass of foliage, the difficulty of rendering the whole harmoniously is very great. The object must be to subdue as far as possible the excessive action of the lighter parts and, at the same time, to bring forward the weak details. This can only be done by using very little pyro., with a medium quantity of alkali, and just sufficient bromide to prevent fog. The operation of development in this case is a lengthy one, and must on no account be hurried, or the effect will be to render the high lights opaque. It is almost an absolute necessity to resort to silver intensification in order to reach printing density without fogging, as the prolonged action of the weak alkali appears to act unfavourably upon the shadows. Such subjects, however, are rarely satisfactory, owing to the invariable presence of more or less "halation."

Such are the general rules which we may lay down for the guidance of those who work processes similar to our own, but we only recommend them to be used with due admixture of judgment. In order to apply them to other processes we may give the following hints:—Plates prepared with the bath require less alkali and more pyro. than above stated. Emulsions prepared with considerable excess of bromide require a larger proportion of alkali in order to produce a soft picture, and may be developed without extra bromide. Bath or emulsion plates which have been submitted to the action of an organifier, such as tannin, gallic acid, or other reducing agent, develope to density with a less expenditure of pyro. than if a non-reducing or neutral organifier be employed. Emulsions prepared with excess of silver, or bath plates from which the greater part of the soluble haloid has been removed, must be treated, from the first, with a much stronger developer, especially as regards ammonia, and duly restrained.

In looking over, a few days ago, the collection of stereoscopic pictures belonging to an amateur friend we were struck by the large number which were more or less spoilt in consequence of having been badly mounted, or, perhaps, more correctly speaking, badly cut. The defects arose not so much from the two halves being mounted at too great a distance apart as from their not having been cut upon the same base line, the effect of which was to render it impossible to combine them correctly in the stereoscope, no matter how much the eyes might be strained. Upon pointing out the fault we found that our friend himself was not unaware of its existence, but confessed himself utterly unable to overcome it; and in the course of further conversation we learnt that it was his custom to cut out the halves separately without having any definite base line upon which to work. This was at once sufficient to account for the fault, for it is plainly next to impossible to place the cutting shape in exactly the same position in each case with no assistance beyond the unaided eye. For the benefit of any of our readers who may be similarly placed we will detail our own method of procedure, which removes at once all difficulties. The first step consists in forming a perfectly straight and horizontal base line, which may be done by selecting a point in the immediate foreground of one half of the print and where it is intended to cut it—such as a stone, a leaf, the point of a rock, or any similar distinctive feature—and having picked out the corresponding point in the other half, lay a straight edge accurately against the two and pass the cutter along the whole length of the double print. This will form, provided the camera has been properly levelled when the negative was taken, a perfectly horizontal base. If the glass shape be now laid down so that its bottom edge correspond with the newly cut-edge, both pictures will be in exactly the same plane. A very convenient plan which we employ, and which enables us to cut the two halves in one operation, consists in folding the print in the centre between the two pictures, taking care that the extremities of the base line coincide accurately, when the cutting mask may be placed at such a distance from the folded edge as will suit the distance of the centres, and the two pictures cut in the one operation. As the distance between the centres of the twin lenses in most cameras is greater than the required distance when the prints are mounted, it will be necessary to find by trial how far the shape should be placed from the central fold. It will be found in practice that the nearer it approaches the fold the nearer will be the centres of the picture when reversed.

ON PERMANENCY.

The question of the permanency of carbon *versus* silver, and some side issues in connection with it, were discussed a little while ago with some little acerbity of style in these pages; but "Time, the healer," having done his work, I may be permitted to reopen the subject without fear of opening old wounds again. It is truly, as we often read, one of great and paramount importance, the whole future

of our art being bound up with it. The evanescent character of too many photographs is too well known by the public, and the profession are well aware that most of those taken during the old "toning and fixing" period will fade, and that a very large number by the alkaline toning do fade. It is not my present purpose to discuss the question from its chemical aspect, but more from a practical standpoint, taking rather the view of the outsider.

It is often the subject of comment that some photographs have faded and some have remained fresh out of the same batch of pictures. In many cases, and to a great extent, the whole difference has been caused by the mode of keeping or storing them. I was very much struck, the other day, in opening a packet of *cartes* toned by alkaline gold, that had remained intact for over ten years, to find distinct traces of fading upon every one. A closer examination, however, revealed the fact that, except in a few cases, the fading followed a certain rule of uniformity. It did not show upon the middle of the photographs at all; the faded and discoloured part of each picture lay for a greater or less distance entirely at the edges. This was clearly the action of the atmosphere. The tightly-pressed cards admitted little air, there was no free circulation amongst them, so that the portion which, so to speak, was enclosed between the individual pictures was very infrequently changed or interfered with. Here, it was evident, the pictures did not necessarily contain within themselves the elements of destruction. The latter were of foreign introduction entirely. It follows that any of this batch of pictures, if framed in a suitable manner, would have been quite as good as the day they were first taken. To some extent this is encouraging, but should in no sense cause efforts to attain absolute permanency to be relaxed in the slightest degree. Carbon photography proper, we know, must be absolutely permanent; but the goal of our efforts is not merely permanence, but beauty of result, and that, it is universally admitted, is not possessed by the latter, but with pigment photographs almost any effect is obtained. Nevertheless, though ever straining after the attainment of an ideal, it is justly permissible to compare ourselves and our work with pigment pictures of another kind. We may compare the relative permanency of a photograph in silver or pigments with a good water-colour drawing by a well-known artist.

The National Gallery and other places where opportunities are afforded of examining large numbers of pictures testify in an unmistakable manner that very many water-colour pictures are gradually becoming worthless. It will be in the recollection of many what an outcry was raised at the damage done, chiefly by the combined influence of light and some damp, to many valuable works at the Manchester Art Treasures' Exhibition, which was open only a comparatively short time. What an outcry would have been raised against photographs if before an exhibition of them had been many months open the leading pictures began rapidly to fade! but I think my readers will bear me out in saying that under such circumstances photographs would not have so soon succumbed.

And quite recently a fresh alarm against the water-colourists has been raised by a voice carrying great weight. Ruskin, the great critic and "Turnerophilist," a little while ago published a letter in which he practically stated that all water-colour pictures in general would go to the dogs; already, owing to want of proper care, an invaluable set of Turners were now ruined, and others, from the same causes, were following fast in their footsteps. The letter interested me much, as it illustrated so forcibly the injustice of the public in blaming the fugitive character of photographs when kept under improper conditions. This letter, however, was followed by another by the same hand, introducing one by Collingwood Smith—a name well known and respected wherever the sway of art is felt—Mr. Ruskin's first statements being somewhat modified.

While perusing Mr. Collingwood Smith's letters I had in my mind the large and increasing importance attaching to photographs coloured by hand, some professional photographers looking upon that part of their business as the most paying part. It is well-known that most artists who colour photographs in the main use body colour to obtain their effect, to the use of which, in some minds, a very great objection exists. The letter also has a bearing upon the question of some pigments which possess an interest through recent special developments of autotype photographs, in the particular direction of beauty and richness of colour—an effect which I believe I am correct in attributing, in a great measure, to the use of carmine and indigo, in combination with an uncertain amount of carbon. These points are so well and conscientiously treated that I may venture to insert in full Mr. Collingwood Smith's letter to Mr. Ruskin.

Wyndham Lodge, Brixton-hill, S.W., July 16.

Dear Sir,—Your recent letter in the *Daily Telegraph* has more than confirmed the opinion expressed by Lord Henry Lennox in the House, "that Turner's drawings will not bear exposing to the light." As Lord Henry is a pupil of mine, and an amateur of no great experience in these matters, I did not think it worth while to remark on his recent utterance; but as your corroboration has attracted so much attention, and with all the weight which must attach to your knowledge and experience in art generally, and in Turner's particularly, I would venture respectfully to urge the publication of a second letter (should you think it advisable to do so), setting forth that water-colour art generally is not of the same evanescent character of those works now consigned to the shades of the National Gallery. The art public, and especially art purchasers, are totally unaware of the extensive use of chromates of lead and other dangerous and fugitive colours used by Turner, which are discarded from the colour-boxes of all water-colour painters in the present day as dishonest and untrustworthy agents in carrying out his ideas. He no longer uses Antwerp blue, orange, or yellow chrome, or any mixtures of indigo and Indian red which have thrown discredit on De Wint's works. He ceases to employ flake or lead white—the latter only in use in Turner's day, to which may be attributed the extreme decadence of his works—in water-colours. In addition to this, the grey paper on which so many of Turner's studies were executed is largely saturated with indigo (a very fugitive colour), and the mineral colours have driven out this tint in almost as great a degree as the scathing rays of the sun. The painter who conscientiously abstains from colours of the class alluded to may naturally offer to his purchasers works which at least stand the brunt of time and the deteriorating action of light and impure air as well or better than the oil picture; for the latter is immediately exposed to these evil influences, while the former, being hermetically sealed, cannot be so easily attacked. I have a drawing by Cornelius De Witt, c. 1669, chiefly in body colour, which is as firm and as strong as when first painted, and others by Rigaud, in 1805, as brilliant as colour can be. I have also a Frederick Tayler, which is more than forty years old, with the body white, as pure as snow. All these examples have hung for many years in bright light. Many other instances in my experience and that of my colleagues could be cited in proof of the permanence of water colours; and, although your testimony to endurance only refers to one subject, which it may be presumed from the context has been carefully kept from light, your letter does not lead the uninitiated reader to suppose that any water-colour works will endure the action of light, and, by inference, such art is bad property, as all unenduring matter must be; and this impression coming, as it does, at the end of a bad art season, and from so high an authority as yourself, is likely to have a very disastrous effect upon water-colour painters, by the alienation of our so-called patrons, who will hesitate to spend their substance on works which are unfit for mural embellishment.

I feel sure you did not wish to convey this impression by remarks which were confined to Turner's works—remarks every word of which is full of truth, so far as that great painter is concerned, and as full of pungency in reference to those refined members of society who will not provide a curator of those treasures which are virtually sealed to the public eye. Having no wish to occupy your time by a reply to the foregoing remarks, I shall think it no discourtesy if this note be unacknowledged; but hope, if you think the matter worthy of attention, you will give the public some assurance that water colours will bear exposure; and, although all earthly things must fade and decay, these will not be "Time's first victims."—I am, dear Sir, yours very truly,

COLLINGWOOD SMITH.

To John Ruskin, Esq.,
Society of Painters in Water-colours.

Artists of any ability who work in concert with photographers have their own settled method of working, and, usually, would brook no interference; but if this letter were brought before them, and the fact pointed out that the remarks have a double value when applied to paintings with a silver photograph as a base, it might in many cases be the means of avoiding some very prominent causes of the want of permanency. But my strong recommendation is, for all such pictures, to discard silver altogether and adopt the autotype process; for, with the utmost care and knowledge in the use of colours, the result of painting upon silver, in most pictures I have seen, has been that the colours and the chemical components of the image have reacted upon each and resulted in fading—at an earlier date, too, than an average *un*coloured print. The Autotype Company, as we know, have devoted much time and experimental research to the selection of suitable colours, and they have written authoritatively as to their opinion on certain classes of the tissue they are compelled, by the demand of the public, to make. If all who have at heart the interest of our art will bear in mind the precepts to be learnt from Mr. Smith's letter when working with the carbon process they need never fear, with the aid of the intelligent coöperation and advice the Autotype Company are always ready to give, having faded pictures on hand, whether of silver or so-called carbon.

G. WATMOUGH WEBSTER, F.C.S.

THE OPTICS OF PHOTOGRAPHY.

[Lecture delivered at the Stevens Institution of Technology.]

THE material universe forms one vast system—a whole, in which no part can exist in a state of isolation from the rest. It is impossible to bring any influence to bear upon one of them without affecting everything else. When Newton saw the apple fall the train of thought suggested to his mind began its effect upon the thought of all succeeding time; while the change produced in the earth's centre of gravity by the change of the apple's position affected not only the

planets on the very outskirts of our system, but even the remotest of the fixed stars. So also every branch of physical science necessarily affects every other branch, insomuch that it is impossible to study one and exclude the rest. We cannot become proficient in physics without a knowledge of chemistry, nor in chemistry without a knowledge of physics. All sciences are mutually indebted to each other, and all profit by discoveries in any one of them.

In the subject of the present lecture we have an example of the interdependence of optics and chemistry. Photography owes, perhaps, its origin to the science of optics; but it soon made good its indebtedness by originating, in its turn, considerable advances in practical optics.

In the latter half of the fifteenth century the *camera obscura* was invented by Baptista Porta, and certainly no one who ever beheld the image produced in this well-known instrument could help a feeling of regret that it was not permanent, and a desire to make it so. Thus did the invention of this optical instrument give the first impulse in the direction of photography.

When Daguerre had solved the problem of fixing the image of the *camera obscura*, his chemical discovery immediately reacted upon optical science. Chemistry called upon optics for the means of producing an image so accurate and perfect in all respects as to be worthy of that permanence, of that immortality which she could confer. This was the great problem in practical optics of the day, as will be readily conceded after an explanation of what was required, what were the difficulties, and how thoroughly they have been vanquished. This problem and its solution originated and now constitutes the science of photographic optics or the optics of photography.

To obtain a proper appreciation of the question it will be well to begin at the very beginning. When a ray of light passes from a rarer to a denser medium—as, for example, from air into glass—its course is changed by being bent towards the line perpendicular to the entering surface. On passing from glass into air it is bent in the opposite direction. In *fig.* 1 the upper half of the circle, above X Y, is a rarer, and the lower half a denser, medium. The ray A B is bent in the direction B G. The amount of this bending or

FIG. 1.

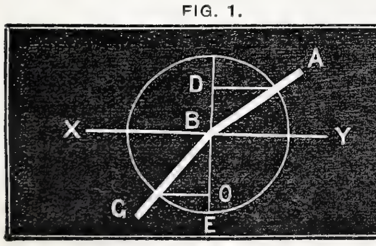
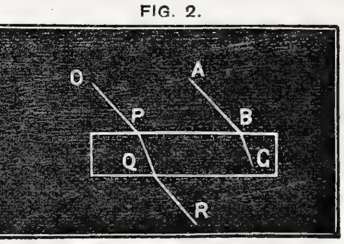


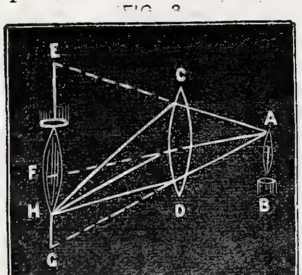
FIG. 2.



refraction varies with the nature of the substances employed, and is found by dividing the sine of the angle of incidence by the sine of the angle of refraction. In *fig.* 2, let Q G be a bar of glass; then the ray O P will be deflected on entering the prism by being bent towards the perpendicular; while on leaving it again and passing into the air, it will be bent as much away from the perpendicular, and will, consequently, emerge parallel to its original direction.

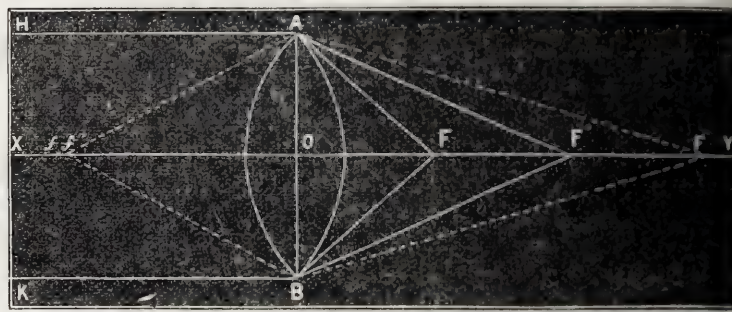
This principle was beautifully shown by projecting an arrow on the screen and then interposing a bar of glass between a part of it and the rays. The result was that, where the rays were intercepted by the glass, the arrow was broken, and the broken piece stood either above or below the rest, according to the inclination of the glass. Now, if the intercepting glass be made in the form of a lens, all the rays striking it from any one luminous point will be refracted to a point on the other side of the lens, because it is made up of a number of prisms the angles of whose surfaces grow more acute as we pass from the centre to the ends C and D, *fig* 3. In this figure we have three out of many rays striking the lens from A; by carefully constructing the passage of these rays it is found that they will all meet at the point H. The same can be shown with any other point of the candle A B so that if a screen were placed at E G we would obtain a reversed image of the candle.

FIG. 3.



Passing now from this general statement to the principles involved, we find that parallel rays, falling on an ordinary glass lens having both surfaces of the same curvature, will meet in the centre of curvature on the other side of the lens. Thus, in *fig.* 4, the rays H A, K B will be refracted to the point F. The same would be true for any other parallel rays not drawn in the figure, because they would be acted on equally by the opposite surfaces of the lens; and they would be bent less and less the more we approached the middle of the lens, because the angle decreases more and more. The point

FIG 4.



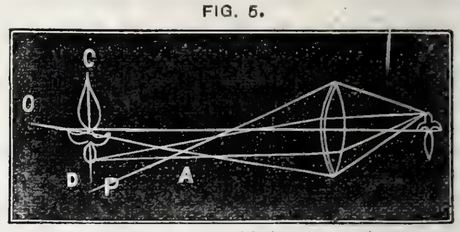
F is called the focus, a word meaning fireplace. Conversely all rays starting from F would emerge parallel on the other side of the lens.

If now we suppose the lens split in half in the direction A O B, and one half removed, its converging power would evidently be reduced one-half; in other words, the focus will be twice as far off, and the rays H A, K B will now be bent only to F′. Conversely, rays starting from F′ will emerge parallel. Now, if we put the other half of the lens on again, rays starting from F′ will converge at f', just as far on the other side of the lens. It is evident, moreover, that the further the source of rays is removed from F′, in the direction F′ Y, the less their divergence, and the easier it is for the lens to make them converge on the other side. Hence the further we put the source of light from the lens on one side the nearer the lens will its rays be brought to a focus on the other side. Thus the point F″ corresponds to f''. Conversely, rays proceeding from f'' will diverge so much that the lens can bring them to a focus only at F″. Two points having such relations to each other are called conjugate foci.

[To illustrate this the lecturer had a lens and a burning candle on the stage. Placing the candle at a proper distance from the lens an image of it was produced on the screen. When the candle was then brought nearer the lens it was found necessary to move the lens further from the screen to get an image, and when the candle was further removed from the lens the latter had to be placed near the screen. It was also observed that the nearer the candle was to the lens the larger was the image produced.]

Unfortunately it is impossible, even with the most skilful workmanship, to construct spherical lenses which bring objects to a perfectly-sharp focus. This is especially the case with large lenses. Thus rays coming from the bottom of the inverted object in *fig.* 5 will

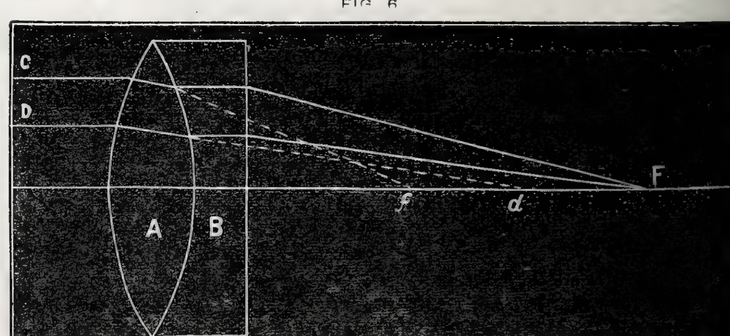
FIG. 5.



not at all meet at the same point. Those passing through points near the centre will meet at D; those passing through the ends will come to A; and intermediate rays will assume positions between these two points, so that a blurred image results. This error is called "spherical aberration."

This defect is corrected by joining to our double convex lens another having one surface concave and the other plane, as in *fig.* 6.

FIG 6.

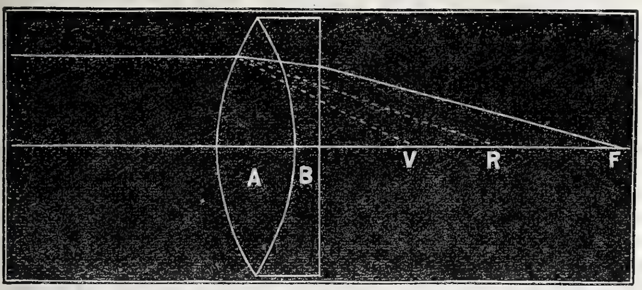


The refraction is greatest near the points of the lens A, because the angle between its two surfaces is greatest there. On adding the lens B, however, which acts in the contrary direction, the rays are

lifted up most near the ends of the lens, just where they need it most, and a compensation is thus effected. By the use of the lens A alone the ray C would pass to *c*, and the ray D to *d*. On adding the lens B, however, both will converge at F.

Another source of error lies in the fact that the rays of light are of different refrangibility, so that the red rays will pass to one, and the violet to the other, end of a band called the spectrum, in which the other colours occupy intermediate positions. Now, as these different rays possess different photographic power, we would obtain an image of varying intensity. This is called "chromatic" aberration. To correct this defect a similar arrangement is employed as in the case of spherical aberration. It has been found that some kinds of glass possess a greater power of dispersion—that is, of separating the rays of different colours—than others. Taking ad-

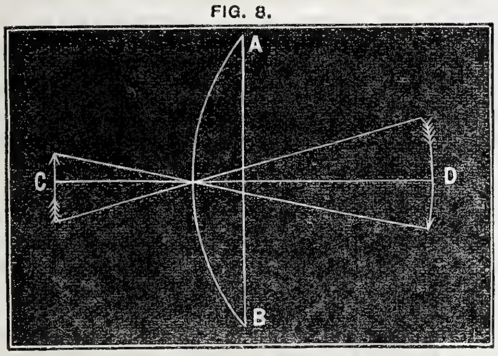
FIG. 7.



vantage of this property the lens B (*fig.* 7) is made of heavy lead glass, having a high dispersing power. With the lens A alone the ray S would have been separated into a series of colours stretching from V to R; but on passing through B they undergo a reversing process and are brought to a focus at F. Either lens alone would produce a chromatic aberration; but placed together they correct each other because they act in opposite directions.

A third source of error is what is known as "curvature of the field." It is evident, on inspecting *fig.* 8, that rays of the same

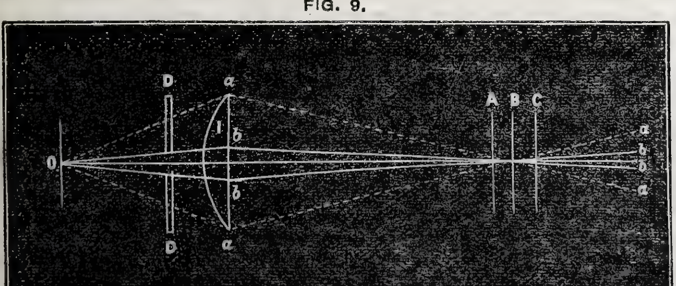
FIG. 8.



length passing from an object C through the optical centre of the lens A B will not form a flat, but a curved, image. If, therefore, a flat screen be placed at D the top and bottom of the arrow will be out of focus; and if the screen be properly placed for the top and bottom of the arrow the middle will be out of focus. The different parts of the image evidently do not lie in the same plane; and to correct this error the same device will have to be employed as in photographing at the same time objects lying in several different planes more or less distant from each other; in other words, we must produce what is known as "depth of focus." This is necessary even in taking a portrait, where the nose and ears of the sitter, for example, would come to a focus at different distances from the lens.

The depth of focus is increased by means of the diaphragm or stop, an ingenious contrivance, shown at D D in *fig.* 9, by which all

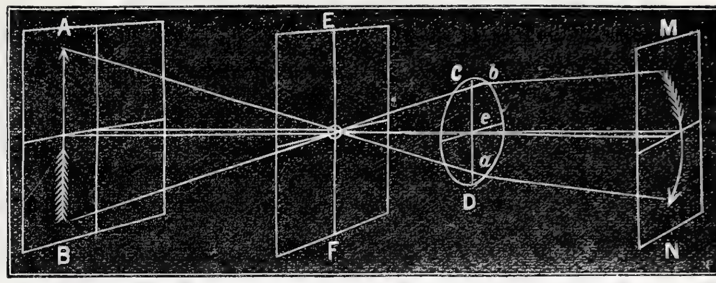
FIG. 9.



rays coming from an object at O are cut off, with the exception of those passing through the opening. Without the stop the outer rays O *a* would diverge considerably on both sides of the focal point cut by the screen B; and if this screen were moved to the position A or C the curvature of the resulting image would become very appreciable. With the stop, however, the screen could be moved anywhere between A and C, and a tolerably sharp image produced.

It is not possible, however, by the use of the diaphragm alone, to correct the curvature of the field entirely. The effect of the diaphragm is really to divide the lens into as many little lenses as there are pencils of light passing through it. Some of these pass through the ends of the lens where there is greater converging power, and are, consequently, brought to a nearer focus than those passing through the middle. This circumstance of itself would tend to produce a distortion. This is shown in *fig.* 10, where the parts of

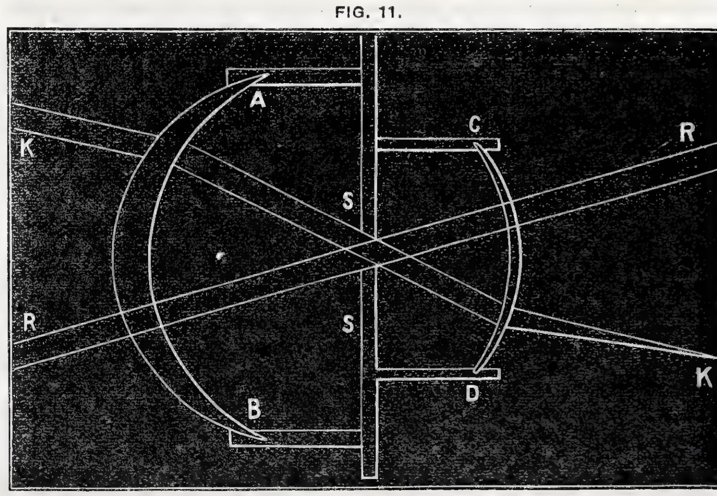
FIG. 10.



the arrow A B not lying in the axis of the lens C D (and consequently obliged by the diaphragm E F to pass through the ends of the lens at *a* and *b*) are brought to a focus nearer the lens than the middle points.

It has been found by experience that a convergent meniscus lens, provided with a stop and placed with its concave side toward the object to be photographed, will produce the least amount of curvature of the field. When the convex side is turned towards the object, a greater curve is produced in the opposite direction. Hence, by combining two such menisci, and placing a diaphragm between them at the proper relative distance from the lenses, this fault is entirely overcome. These and other considerations, which would take us too far, led Mr. Zentmayer, of Philadelphia, to invent his celebrated lens, a representation of which is given in *fig.* 11.

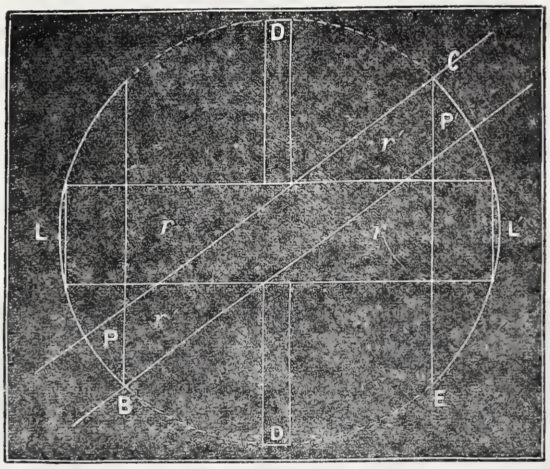
FIG. 11.



Here we have two menisci, A B and C D, with a stop, S S, nearer the smaller one. The lenses are made of the same kind of glass, and yet counteract each other's errors so well as to produce a very perfect instrument. The leading principles will be better understood from the following drawings:—In *fig.* 12, let A B represent two plano-convex lenses, exactly alike, and so placed that their outer surfaces form parts of an imaginary sphere, A B C D. Then, neglecting refraction for a moment, it is evident that a bundle of rays, *r r*, which the aperture of the diaphragm D D allows to pass through both lenses, will be affected only by the little lenses L, L′, and two blocks of glass having parallel surfaces. Hence, we will get only the insignificant amount of spherical and chromatic aberration due to two minute lenses. The rays *r′ r′*, passing through the edges of the lenses A B and C D, will be affected only by the two prisms P and P′, which will counteract each other, being exactly equal and opposite. For the reason already stated, and on account of the refraction of the rays, the diaphragm is not placed in the centre, but a little to one side. This instrument

has a most remarkable depth of focus, and produces most excellent results.

FIG. 12.



[To show that any refracting medium—water, for example—could become a lens when made into the proper shape, the lecturer placed a watch glass in the path of the rays coming from a vertical lantern containing a slide of a fine piece of statuary. Nothing was visible on the screen until he poured water into the watch glass, when the image came out with surprising distinctness. The applause which followed this striking experiment sufficed to agitate the water, disturbing the shape of the lens and destroying the image, which did not perfectly reappear until the water came to rest. One of the most astonishing effects that a lens is capable of producing was shown by the aid of an instrument called the megascope. This is nothing more than a dark box, having a lens in front and illuminated inside with an oxycalcium light falling on a sheet of white paper in the rear of the box. When the hand is held as close to the light as it can be without burning it, an immense image in natural colours and startling relief is produced on the screen. The huge proportions of this mammoth hand produced a ludicrous effect when compared with the hand of an assistant standing near the screen. Other objects, such as a plaster cast, a mother of pearl shell, an apple cut in half, and the works of a watch, were then shown with splendid effect. The images of these objects are so large that it is difficult to keep them in focus in all their parts. The lecturer concluded by exhibiting a number of photographs upon the screen, pointing out their artistic excellence and defects in accordance with the principles laid down.] HENRY MORTON.
—*Scientific American.*

ON THE PREPARATION AND COLOURING OF TRANSPARENCIES FOR THE MAGIC LANTERN.

CHAPTER II.—ON THE PROPER KIND OF NEGATIVE—*(Continued).*

HAVING finished the set of negatives dry them well, but do not varnish. Touch out any pinholes or spots; then take strips of black or brown paper which has been previously gummed and allowed to dry, and cover round the margin those parts of the negative which are not required, so that when held up no light can pass through any part of the negative but the picture. This paper being gummed on all round the picture also prevents the negative from being scratched when laid one on the top of the other, and gives a clean transparency, as the margin will be clear glass.

For copying from photographs which are unmounted a perfect negative may be taken by putting the photographs in a bath of clean water, and while still in the water take a plate of glass a little larger than the photograph, and lay the photograph on the plate, photograph side next the glass; raise one end out of the water, press out all the air-bells, and then dry the other side of the glass with a clean rag or cloth; wet a piece of blot-sheet the size of the photograph and lay it against the picture to keep it from drying; place it against the wall, fasten with drawing-board pins, or carpet pins, which are larger, and copy with a top light. Any light coming from the front will show a reflection which would ruin the negative. I lately copied six dozen photographs of Indian views which were about nine inches by seven, and they had to be copied for slides on full plates, the size of the transparencies being 8 × 6 inches; and, although they were shown on a thirty-feet screen by a pair of the most powerful lanterns in the kingdom, there was not the slightest appearance of granularity, no more than if they had been taken from the original negatives.

CHAPTER III.—THE SLIDE.

Take a square deal box about ten inches square every way, no lid being required. In the bottom of the box cut an opening large enough to admit a 5 × 4 glass. Inside of the box nail or glue on narrow slips of wood round the opening, just broad enough to keep the 5 × 4 glass from falling through. Paint the inside of the box with lampblack, or paste black paper all over the inside. This is the box through which the negative is to be copied. Place a tube, the end being next the window, and lay the box on its side with the cut opening six inches or so from the window, and point the camera into the box, so that the light coming from the window may pass through the negative into the lens of the camera. Before going any further a sheet of ground glass must be fastened against the window, the size of the pane of glass opposite the box. By this means the negative will be equally illuminated all over. To keep the negative in its place two small brass catches will require to be screwed on each side of the opening; and now we are ready to take the slide.

Thin quarter-plate glasses may be used for this purpose, but they must be free from scratches or bubbles. Coat the plate, and then look after the camera. See that the picture is the proper size, and in its proper place—fair in the centre. The ground glass will require to be marked for this purpose also. In putting the sensitised plate into the cell always place it in a vertical, and not a horizontal, position. But you say—"If I do this the picture will be the wrong way on the glass." Not at all; to put the picture right turn the box that holds the negative. The box is square, and the centre will always be opposite the lens, provided it has been so arranged at first. And even if the picture be not quite straight on the ground glass of the camera, two small wedges placed under the side of the box where required will put that right; so you see that this simple arrangement is perfect, and the cost is about sixpence.

The reason why the sensitive plate should always be turned up and down in the cell is this:—The quarter-plate is exactly the breadth required; therefore, taking the square, it is a little longer than is necessary, and any drainings of silver which may flow to the bottom of the plate and cause markings will not affect the picture, having plenty of room to come and go upon the plate, whereas in the other way there is none. However, such is the plan I have found best.

Having put the cell with the sensitive plate in the camera, see that no reflected light from back windows or otherwise gets access to the negative box. If this be the case, and it cannot be avoided, put a small board or pasteboard mount across from the copying-box to the camera, and over the board throw a piece of black velvet. Having all prepared use as small a diaphragm or stop as can be comfortably employed without making the exposure too long. As a good exposure must be given develope with the iron developer as before, but watch the transparency very closely, as it will come out all at once. As soon as all the details are seen wash off; do not for an instant hesitate about doing this, or the result will be a dirty slide if the developer remain too long on, no matter how clean the glass may have been. Besides, you cannot get more detail; all that can be got is intensity, which is got much cleaner after fixing than before. If these instructions be followed the lines will be clean and sharp on a plate of clean glass.

If there are many slides to be done further operations after fixing had better be delayed until the evening, as they can be finished quite as well after the daylight has gone, which is too valuable in the winter season to waste. To preserve the slides moist—which they must be—have a box with a close-fitting lid of a convenient size; in the bottom of the box put wet blotting-paper; in this box put the slides leaning one against the other, film side inwards, and they will keep fresh for at least twelve hours.

When the day's work is done—as far as operating with the camera is concerned—take the slides out of the box, one by one, and see if they have sufficient density or force; if not, a slight intensification by means of pyro. and silver will easily bring them out. To blacken them use chloride of palladium. I find this the easiest and most perfect method of securing fine black tones; and, as the chloride of palladium can be easily procured from any extensive dealer or photographic chemist, there is not the slightest difficulty in the way of its use. It can be purchased in the liquid state, perhaps of the strength of say ten grains to the ounce, which when diluted with an equal bulk of water is ready for use. Merely pour the solution over the plate and back again into the bottle. Although it is a little expensive, a small quantity goes a long way.

If the slide is not to be coloured it is now finished and ready for mounting; but if intended for colouring then there is another operation to go through, and that is to prepare the slide to receive

the colour. In some works on this subject it is advised to varnish the slide previous to colouring. Now, as the slide requires to be varnished again after colouring, the consequence of adopting that plan would be this—on pouring on the varnish the second time the first coat would be dissolved and cause the colour to run in streaks all over the picture. THOMAS ROSS.

FOREIGN NOTES AND NEWS.

CARBON PRINTS ON GOLD AND SILVER PAPER.—DR. HARNECKER'S ENLARGEMENTS ON IODISED PAPER.—TWO CEMENTS FOR MARBLE, PORCELAIN, &C.—A SILVER BATH EXPLOSION.—ANOTHER GLASS TOUGHENING PROCESS.—LONG EXPOSURE.—THE RADIOMETER.

It is rumoured that Herr Geldmacher lately exhibited two curious carbon prints in which two antique gold and silver vases are represented in their natural colours with a black background. They were produced by transferring a carbon print to gold and silver paper previously prepared for its reception by means of a thin film of gelatine. The design and the shading, as well as the background, are produced by bichromated gelatine, the gold and silver colouring by the foundation upon which the latter is laid. The neat way in which the dark background is produced is also highly commendable. He first prepared a rather deeply-printed silver copy and cut out the design as if for a stencil pattern. He then fastened the hollow mask so obtained upon the negative, so that its inner edge corresponded exactly with the outline of the vase, and upon the mask he fastened the sensitive carbon tissue, regulating the exposure with a photometer. The piece cut out of the centre of the silver print, having in the meantime been exposed until it became black, is gummed down exactly in its place; the surrounding mask is removed, and the background exposed until it appears dark enough.

Some time ago a report was afloat that serviceable photographic prints had been obtained upon sensitised iodised paper. That the report had a substantial foundation upon fact is proved by an account which Herr Voigt, of Frankfurt, gives in the current number of the *Monatsblätter* of a visit which he paid to Dr. Harnecker, of Wrietzen. Some iodised paper was sensitised on a silver bath, and, meanwhile, Dr. Harnecker took a negative portrait of his visitor, after which, as the sun was not out, two copies of the portrait were printed with the assistance of lime light. Each print was exposed from twelve minutes to a quarter of an hour, after which it was developed by being floated, picture side downwards, upon a pyrogallic acid bath. After being developed the prints were washed with clean water and fixed in a fresh soda bath. Four enlargements were then made, and the process went on with such precision and celerity that during the three or four hours to which his visit extended half-a-dozen impressions were advanced as far as the final washing.

The iodised paper has a bluish-green tint, caused by free iodine and a small quantity of starch and iodine, the latter of which is formed by the action of the iodine salt upon the size of the paper. The silver bath for this paper is one part of nitrate of silver to twenty parts of water (and a trace of citric acid is recommended). The paper should be allowed to float upon this bath until it becomes perfectly white, which usually takes place in about five minutes. When removed from the silver bath the paper, still in a wet condition, is exposed, by sun or lime light, in a solar camera until the contour of the picture can be faintly yet distinctly seen. It is then developed, in the manner described above, with the following developing fluids:—

No. I.

Water	2 litres.
Pyrogallic acid	1 gramme.
Citric acid	3 grammes.

No. II.

Water	2 litres.
Gallic acid	1 gramme.
Alcohol	10 grammes.

It is fixed with one part of hyposulphite of soda to six parts of water; in this the pictures remain from a quarter of an hour to twenty minutes. Should the pictures be too red they may still be toned in a gold bath of one part of gold to 1,000 parts of water.

The oxygen lamp used by Dr. Harnecker, and constructed by himself, is both very simple and easily used. The oxygen is generated in the usual way in an iron retort, by half filling it with a mixture of two parts of potassic chlorate and one part of manganic oxide, and heating slowly in order to prevent the gas coming off too freely. By means of an elastic tube connected with the retort the oxygen is conducted through the purifier—a vessel filled with water—and from that to an elastic bag. When the bag is filled it is connected by a tube with the small tube of the lamp. A weight is then placed upon the bag in order to force a stream of the oxygen against the lime cylinder and thereby produce the brilliant lime light. Dr. Harnecker's lime cylinders are prepared in a particular manner in order to get a light of as high chemical power as possible; he calls them "calcereoboro-livine cones."

In the transactions of the Berlin Polytechnic Society a mixture of marble dust, glycerine, and litharge with waterglass is recommended as a cement for water tanks of marble slabs, &c. It is said to be unaffected by hot water. A mixture of twelve parts of cement, six of whitening, six of fine sand, and one of infusorial earth, stirred to a paste with waterglass, is also mentioned for the same purpose.

The *Photographische Monatsblätter*, in adverting to a case of explosion which occurred when evaporating a silver bath, is of opinion that the immediate cause was the formation of nitro-glycerine, and supposes that the collodion must have, either accidentally or otherwise, contained glycerine, which combined with the nitrogen of the silver bath to form the above-named highly-explosive compound. It is not said whether the explosion had any fatal consequences or not; but what with warning as to fulminate of silver on the one hand, and nitro-glycerine on the other, the boiling down of an old silver bath would seem to be a most dangerous operation.

A week or so ago we alluded, in our *Scientific Jottings*, to a rumour that M. De la Bastie's process for hardening glass had met with a rival in a process patented in Germany by Herr Pieper, by which the glass is hardened and tempered by exposure to superheated steam. Now another rumour has reached us to the effect that yet another process has been patented by Herr F. Siemens, of Dresden, by which glass is hardened, pressed, and tempered simultaneously. Instead of being plunged into oil or steam, a diametrically opposite plan is taken, the liquid glass being run into metallic moulds, which are immediately pressed together, the pressure of the cold metal having the effect of cooling the glass. For blown glass a cover of platinum is interposed between the glass and the mould. Rumour and speculation, always proverbially untrustworthy, are especially so in matters scientific, so that when further details come to hand it need surprise nobody should the two apparently opposite processes turn out in the end to be but different stages in one and the same process patented by the joint inventors. This, however, is mere guesswork, so we shall wait patiently for more light on the subject; hoping, meanwhile, that the new process or processes may be of more use to photographers than that of M. De la Bastie.

In this hot, dry weather, when one is frequently obliged to take a view or a portrait at a considerable distance from the dark room or its substitute, the tent, and that without being able to get a room in which to coat a plate, a formula by which the plate may be kept fresh for hours, and at the same time free from dry spots, is especially welcome. This is said to be attainable by following the accompanying directions:—Dissolve one grain of nitrate of silver in 120 grains of water, and add 120 grains of pure glycerine. Sun the mixture for a few days, until the silver is precipitated as a grey powder adhering to the sides of the bottle. Then add, as required, from thirty to sixty grammes of the clear solution to a pound of silver bath acidulated with acetic acid. We should also, having an eye to the avoidance of nitro-glycerine explosions, advise caution when evaporating the same silver bath.

While it is quite true, as "Free Lance" observed in last number that foreign *savants* have only recently awakened to the fact that there is such an instrument as a radiometer, it must be admitted that they have now become thoroughly wide awake to that fact, and are investigating the peculiarities and properties of this wonderful little instrument in a manner which contrasts forcibly with the apathy displayed by the scientists in the country which gave it birth.

In a communication to the Berlin Chemical Society Professor Böttger, of Frankfurt, has described a number of most interesting experiments conducted by him with a view to discover the true origin of the motive power by which the arms of the instrument are made to rotate. The radiometer with which the following experiments were conducted was a very fine one, constructed by Geissler, of Bonn, the plates attached to the revolving arms having been made of whitened mica blackened on one side.

The direct light of the full moon failed to effect the slightest motion of the radiating arms; and equally unsuccessful in this respect was the light emitted by phosphorescent Geissler tubes strongly illuminated by the magnesium light. Presuming that a bright gas flame, placed at a distance of ten inches from the instrument, caused it to revolve with great rapidity, a clear plate of alum, 0·2 of an inch thick, when interposed between the flame and the radiometer,

affected the latter to such an extent that it almost came to a standstill. The conclusion deduced from this experiment was that the alum plate was not perfectly athermos; two glass vessels, each 1·2 of an inch thick, and having sides perfectly parallel, were filled with distilled water and interposed instead of the alum plate; the effect of this was to entirely suspend the motion. The conclusion arrived at by Professor Böttger was that these experiments justified the belief that it is not to light, but only to radiant heat, that the motion of the arms of the radiometer is due. He further assumes that the motion of the vanes results from the stronger absorption and easier radiation of heat by the blackened side of the mica plates than by the bright side in a space in which the air is greatly rarefied.

The following curious experiment was also tried:—When the radiometer was placed near a gas flame in a room, the temperature of which was 60° Fah., the arms revolved from right to left, the white side of the mica in front; it was now immersed in a glass vessel full of water of 112° Fah., the instrument having been provided for this purpose with a leaden foot. The motion of the arms became slower until they stopped, when they began to rotate on the opposite direction, the blackened side of the mica being now in front; this continued until the radiometer had become of the same temperature as the water in which it was immersed, when it stopped.

But the experiment just recorded does not hold good with all radiometers, for, on repeating it with one made by Mollenkopf, the results obtained were different; unlike the former, this, when immersed in the vessel of hot water, did not change its direction of revolution.

Both instruments having been set in motion by a feeble light sulphuric ether was allowed to drop upon the glass bulbs so as by its evaporation to cause a diminution in the temperature, the result was that while the motion of one of the radiometers was sensibly retarded that of the other remained unaffected. Dr. Böttger attributed this to the vacuum in one being more perfect than the other, for in all other respects the instruments were identical.

Our Editorial Table.

Hints on Spectacles. By W. Ackland.

London: Horne and Thornthwaite.

When we last noticed Mr. Ackland's valuable treatise on spectacles it was in its second edition. It has now reached its seventh edition; and, from its inherent worth, as well as from the important topics treated, it bids fair to secure the appreciative compliment of a demand for many more. There is no more fertile field for the exercise of quackery and charlatanism than the domain of vision—its imperfections, and the remedying of these by means of spectacles; and very much nonsense has been written upon the subject. By way of contrast, satisfaction is the result of the perusal of such a work as that by Mr. Ackland; for one cannot read even the first page without realising the fact of the subject of vision being treated by the hand of a master in this branch of optical science.

The book is illustrated by numerous diagrams, among which are to be found drawings of the construction of the eye, the various forms of lenses in use for spectacles, and a set of vertical and horizontal lines to aid in the discovery of astigmatism in the visual organ. There are also a variety of useful hints given on the preservation of sight, from which we select as a specimen of the excellent information contained in the *brochure* the following *Short Rules for the Preservation of Sight and the Selection of Spectacles*:—

"It is of the highest importance that near and distant objects should be equally examined, so that the eye may preserve its fullest power of adjustment. This should be done by the unaided eye alone where it is possible, but the short-sighted should always use spectacles, as the power to see at different distances becomes paralysed, and different spectacles for near and distant objects will be required.

"If the eye becomes inflamed from excessive use give it perfect rest, and use an eye water composed of sulphate of zinc three grains, rose water two ounces.

"Irritation and inflammation of the eyelids may be removed by their being smeared nightly with a camel's-hair brush charged with an ointment made of red oxide of mercury three grains, spermaceti ointment one ounce.

"Spectacles should only be worn to compensate for any deficiency or excess of refractive power of the eye, and this deficiency or excess should be most carefully ascertained by the use of the optometer, in order to guide us as to the requisite focus needed.

"The spectacle frames should be adapted to suit the face, and the centre of the lenses should be nearly the same distance apart as the width between the pupils. It must be especially borne in mind that spectacle lenses should be kept free of scratches, as the existence of any impediment to the free transmission of light interferes with vision and irritates the eyes.

"Use the softest wash-leather to wipe your spectacles, and if the lenses become scratched have them exchanged at once.

"In no case should spectacles be selected so as to leave the eyes' adjustment nothing to do, but how much may be left for this power of the eye to accomplish must be determined by the skilled optician, and varies in different cases.

"The long-sighted should not view distant objects through spectacles intended for viewing those near at hand, or an immense injury would be done to the eye.

"The short-sighted ought always to use spectacles, in order to enable them to view distant objects; but whether they should use spectacles to see near objects is a question for the optician to decide in each case on testing the eye, and no general rule can be laid down. In some cases it is beneficial, and in others decidedly injurious.

"Single eye-glasses are injurious, as all the work has to be done with one eye, and their prolonged use is always followed by the focal length of the eyes differing from each other.

"The eye should never view an intense light.

"In using artificial light never allow any of its rays to fall on the eye, but so shade it that the light may fall freely on the book or object viewed.

"Never use a flickering or unsteady light for reading or writing, and avoid being employed on black objects by artificial light, as daylight alone furnishes sufficient light for this purpose.

"Those afflicted with weak sight should avoid the use of gas as much as possible, and read, write, or sew by the more steady and soothing light of a properly-constructed reading-lamp.

"Never read during railway travelling, as the rotatory motion causes a strain on the eye.

"Glasses of a neutral tint should be used to protect the eyes from sunlight when weak or inflamed."

Mr. Ackland is *facile princeps* in the special subject here discussed, and no more safe mentor could be selected for those whose impaired eyesight demands the aid of sound professional experience.

English Landscape Art: its Position and Prospects. By Alfred Dawson, F.R.A.S.

In this essay Mr. Dawson advances the theory that our landscape school of painting is a long way behind the age. Among the leading causes of such artistic immobility he adduces—*First:* the unnatural and insecure constitution of our great representative society, the Royal Academy of Arts, the result being an illogical affinity of its integral parts and of its correlation to the outer world of art. *Second:* the leniency of the press in matters of art, accepting talk for talent, and compliments sown broadcast for sound criticism. *Third:* the introduction of various strange styles of painting and of taste which, though in some measure applicable to some other departments of art where conventionality is almost a necessity, in landscape painting, by their tendency to draw the student from the fulness and richness of nature, are manifestly calculated to become mischievous in their results.

These points are enlarged upon with much fulness, the shortcomings of the Royal Academy being exposed with no sparing hand. The *brochure* will be read with advantage by all who take an interest in landscape art.

Correspondence.

EXPERIENCES IN THE WORKING OF THE WASHED EMULSION PROCESS.

To the Editors.

Gentlemen,—Believing, as I do, in a great future for the washed emulsion process, I have, for the past two years, devoted a considerable amount of time to its practice. Having successively, and I may add successfully, worked perhaps every standard process in photography, from the original daguerreotype and calotype down to the most modern, I think I am in a position to pronounce, with some authority, that for certainty, simplicity, convenience, and rapidity in preparation of sensitive plates I have worked no process whatever which has given me such satisfactory results.

With a good sample of powdery pyroxyline, good methylated ether and alcohol, salted with the bromides of cadmium and ammonium, the resulting collodion kept two or three months before sensitising, then sensitised with silver added in small quantities at a time, left for twenty-four hours with a slight excess of haloids, then poured out to the depth of a quarter of an inch, and, when well set, washed with cold distilled water till free from soluble salts, and the resulting pellicle dried over a water bath perfectly, dissolved in ether and alcohol equal

parts, at the rate of about eighteen grains to the ounce, the emulsion so made being frequently shaken for a week before use, kept as long as possible afterwards, *carefully filtered before use*, and poured on plates previously coated with a substratum of weak albumen—I say that plates so prepared (all being done in *scrupulously* non-actinic light) leave little or nothing to be desired, except in one particular, to which it is the chief object of the present communication to advert.

But before introducing this matter it occurs to me that I should complete my synopsis of the process by saying a few words as to the method of development which I have found most suitable for plates prepared as above. I always employ ammonium carbonate in saturated solution, with as little bromide as possible, and quantities of pyrogallic acid varying from a mere trace to a very appreciable quantity, according to the exposure. I may here endorse the results arrived at by our painstaking, practical Editors, recently given to their readers, and which may be thus summarised:—The fuller the exposure the greater proportion of pyro. should be used in the developer; the less exposure the less pyro.—that is to say, *where it is possible to develope*, the smaller the proportion of pyro. employed the better the chance of a decent negative. It struck me, on reading our Editors' results, that they would be considered heterodox by many; but my own experience entirely confirms them. I may add that I have experienced no difficulty whatever in obtaining any amount of intensity by the alkaline developer, even without the addition to the emulsion of any organifier, such as gallic acid, tannin, soap, &c.

I have said that plates prepared as described leave little to be desired except in one particular, and that is a deficiency of half-tone for gradation. When the picture is only partially developed this is not apparent; in fact, if in this stage the development be stopped and the negative fixed and examined it will be found perfect—if the exposure has been good—and full of the most delicate half-tone possible; but if the development be continued sufficiently to bring the negative up to printing density, a woeful obliteration of half-tone is the inevitable result—in my hands, at all events.

In landscape photography this defect in the process is not so observable; but it was forcibly brought under my notice when I applied the washed emulsion dry plates to portraiture—an application which, from the enormous advantages attending their employment for this purpose, I have been perseveringly trying to accomplish, but hitherto by no means successfully as compared with the results obtained by the old wet collodion process. My experiences and difficulties have been the following:—

Imprimis:—I have found the dry plates quite sufficiently rapid for the purpose of portraiture; but when I came to the development of the resulting pictures—whether the exposure were long or short, and whatever the proportions of the developer—I have always found myself between the two horns of a dilemma. If I arrest the development when all the detail is out, but before printing density has been obtained, I certainly get a negative as full of half-tone as can be desired, but too weak to print a vigorous proof from. And it is rather singular that an apparently equally delicate negative produced by the wet collodion process will admit of a much more vigorous proof being printed from it. Why this is I cannot explain, but I have proved the fact.

Now for the other horn of the dilemma. If the development be carried on to printing density—I mean to the density one would seek to attain in a wet collodion negative—the resulting print, though vigorous enough, is markedly deficient in half-tone. Having, in my time, developed many thousands of negatives, I fancy I ought to know what constitutes a good one; and yet, after very numerous experiments, I have entirely failed to discover any method of combining delicacy of half-tone with printing density in portrait negatives on dry plates prepared with washed emulsion, and if this defect exist in portrait negatives we may be quite sure that, though less apparent in landscape negatives, it obtains in these also.

While seeking for a solution of my difficulty I bethought me of submitting it to a very old photographic friend of mine—a professional photographer of some thirty years' standing. The following is the "opinion" I have just received:—

"Your pictures show very plainly that your emulsion lacks half-tone. If a collodion be wanting in half-tone it is not always apparent on first development, but directly you intensify the picture becomes quite flat and hard from want of *middle tints*. This has been my experience with many samples of my own-made collodion. Even in your stereos. your emulsion shows signs of this fault. It is this which gives the snowy effect to foliage; for a collodion or an emulsion, to be *perfect*, should give light and shade on a sunlit leaf. Mr. Woodbury pointed out to me in some of his view negatives, taken with Mawdsley's emulsion, several tints on the white parts of his views—cottages, &c. His negatives are very thin. When we begin to build up we lose these half-tints in a great degree."

The foregoing is the opinion of a very experienced and successful photographer; but I desire to bring the matter under the notice of the wide circle of emulsion workers for the purpose of eliciting their experiences, not forgetting that of our hard-working Editors; for the general result of my experiments is that, if the defect of which I have spoken can be remedied perfectly, the finishing touch will have been given to that which is, certainly, in all other respects the best process known—that of the *washed emulsion*.—I am yours, &c., W. H. F.

August 19, 1876.

SLOW DEVELOPING OF LANDSCAPES.

To the Editors.

Gentlemen,—Kindly give me a little help on the subject of landscape photography. I have had some experience at it, but have much to learn yet.

Some years ago I accidentally met Mr. George W. Wilson, of Aberdeen; he was photographing a house that was historical, and to get a proper view of it he had planted his camera in a churchyard where I was rambling. I stood beside him while he exposed (wet process); and, although the day was fine, in early summer, I was perfectly amazed at the long exposure given with a tolerably quick-acting lens and a fair-sized stop. He gave it at least ten times longer than I should or could have done. It has puzzled me ever since, and the more I think of it I feel sure that much of his success, and that of other famous landscape photographers, besides experience, &c., is due to the fact of their working with a very weak developer, allowing them to expose most deliberately. Mr. Wilson appeared then to think very little of speed, but everything of cleanliness, freedom from fog, and fulness of detail. He showed me his negative afterwards, and it seemed simply perfect—brilliant, yet soft.

Now my difficulty is, I believe, that I have never had a proper formula for a very weak developer (iron), and I think I have been afraid to use too weak a one, the consequence being that, though I have secured many fine pictures, I cannot think of prolonging the exposure to more than half Mr. Wilson's time; not even that, or else fog and flatness everywhere prevail. Instantaneous work I can do with a fifteen-grain developer; but you will understand I am writing of landscape photography pure and simple—old ruins, foliage, and still subjects like them, on calm days. My difficulty is to work slow enough, for I am persuaded that the keynote to the pictures of the artist to whom I have referred is to be found not only in old collodion and old developer, but in a developer (iron) very much weaker than many use or think of using.

Of course we can be told to dilute, &c.; but will you kindly give me and others who want to know a formula for an iron developer that will certainly be as weak as possible—*slow*, but yet *clean;* and if you can give an idea of the general strength used by landscape photographers it will oblige, as it is one thing to be continually at landscape work, and quite another to be called away from nervous sitters, babies, Rembrandts, &c., and then to be told simply to "dilute." I hope you understand me.

That exposure of Mr. Wilson's has always been a "poser" to me, who was brought up in the faith of strong developers and instantaneous exposures, and compared with which Mr. Wilson's slow but sure method was a queer contrast.—I am, yours, &c., Farnham.

August 21, 1876.

[The above letter indicates a course of experience with which we are unacquainted in connection with Mr. G. W. Wilson. It is only three weeks since we received from that gentleman four proofs from the negatives he had last taken (marine subjects), and, so far from a prolonged exposure having been given to them, they must have been taken in the tenth of a second; for every figure was sharply and plainly discernible upon the decks of steamers, some of which were in motion when arrested by the camera. When we last published Mr. Wilson's formula for developer it ran as follows:—"I take about an ounce of protosulphate of iron, dissolve it in about fifteen ounces of water, and add about one ounce of glacial acetic acid. If the weather be warm and I am afraid of staining my plates I dilute this, perhaps about one-third, with water; but I prefer a strong solution when it is practicable to use it. This developer I apply to my plate in the usual way by tilting it from a four-ounce medicine cup in such a manner as to cover the whole surface almost instantaneously, keeping it flowing from side to side of the plate until all the details are fully out, or so long as it appears to act without fogging."—Eds.]

ON THE ADVANTAGES OF AN ACTINOMETER FOR NEGATIVES.

To the Editors.

Gentlemen,—I have been making some plates from some three years' old collodion, giving eleven grains $AgO\ No_5$ to the ounce. The lights are, however, all shadowed, and for transparencies this is very objectionable; also the fixing seems to dissolve all the image away, and the re-intensification is very difficult. Can you tell me where I erred? Collodion and preservative I had from ———, and I have used the strong developer. In drying is it possible to heat them too much? I have no special drying-case, and put them in the oven for an hour when the fire is out.

I was out lately for a few days in Wales, and took an actinometer, using it on cloudy days and in dark spots, finding it invaluable in such

places as the Torrent Walk. When getting gradually accustomed to the gloom one is apt to overrate the power of the light. I found I should have exposed plates one-third only of the proper time, and, even as it was, I under-exposed some, thinking the longer time must be wrong, although the actinometer registered it. In such cases, when one loses fourteen-fifteenths of the light of day, such an instrument is invaluable, and still many of the deeper shadows come out blacker than is agreeable. A dab of water-colour on the back of the plate, softened down, while moist, with a little cotton wool or the finger, is a great improvement. This is like your late suggestions, but much easier of application.—I am, yours, &c., J. H. T. Ellerbeck.

Southport, *August* 21, 1876.

[It is possible, although scarcely very probable, that the fogging complained of may be owing to the heat of the oven in which they were dried. The experience with the actinometer we regard as of the greatest possible value.—Eds.]

EXCHANGE COLUMN.

Wanted, a rolling-press in exchange for a good photographic tent.—Address, W. Slader, 9, Magdala-terrace, Dulwich, London.

ANSWERS TO CORRESPONDENTS.

☞ *Correspondents should never write on both sides of the paper.*

Registrations.—Next week.

S. S.—So far as we at present remember, the best varnish for protecting the zinc plates from the action of the solution in the battery is composed of sealing wax dissolved in alcohol. It is probable that either common Brunswick black or Bates's black varnish would also answer the purpose well.

J. S. B.—No alteration in the mounting of your lens would render it useful for photography. Under no circumstances would it even work to focus, or even if the focus were properly adjusted would it give a passably-sharp picture. We strongly advise you to discard it, and obtain a lens of more modern construction.

The Edinburgh Exhibition.—We have received from Mr. Bashford, of Portobello, a note in reply to the letter of Mr. Neilson in our last issue. Mr. Williamson, he says, is perfectly able to take care of himself; and we suppose, from the tenor of Mr. Bashford's note, that in due time the reply to Mr. Neilson will be forthcoming.

Poor Amateur.—You must not indulge in a sneer at French polish as applied to cameras; for it forms a most important adjunct to their preservation and the retention of their good-working properties. Place your home-made and unpolished camera in a shower of rain for a few minutes and you will soon appreciate the value of French polish.

E. Y. E.—With a tolerably thick china ink print the name neatly, reversed of course, on the surface of the negative. If unable to print or write in this manner, you may do so in the direct way upon a transparent film, and cement this to the negative; or you may write upon paper with a tacky ink, and then "set it off" upon the negative.

W. H. B.—Not knowing your purpose we cannot offer advice; but we suppose that you are not unaware of the fact that positive proofs may be printed on paper by an exposure of a few seconds, a developer being had recourse to in the bringing out of the image. We cannot tell whether Kennett's pellicle would answer your purpose or not, but it will be very easy for you to give it a trial.

Pictorial Designs.—With reference to Mr. Ferranti's letter on this subject, which appeared in our issue of last week, we have since received from Mr. Higginson, of Southport, the portrait spoken of by Mr. Ferranti. Mr. Higginson, in his note, says that it was taken to illustrate to Mr. Brookes the working out of the idea of his (Mr. Higginson's) new picture. It is certainly a beautiful and artistic photograph, admirably printed in carbon.

Collo-Bristol.—Your friends must indeed be very sceptical after such evidence in favour of the developer as that which has been published; and it is questionable if it be worth while "disabusing their minds." Instead of answering your thirteen questions, we refer you to the papers by Mr. William Brooks published in this Journal, in which every detail is fully described. If, after studying them *and trying to prepare the collocine* you are still at a loss, write again.

Trimming Prints.—In an article published a few months ago we described a cutter form for use with the Robinson trimmer, by which square corners could be cut. At that time we were quite unaware that anything of the kind had been in use previously; but we have just heard from a respected American correspondent that so long ago as December 16th, 1873, a patent for a device similar to that described by us was granted to Mr. Lewis T. Young of Philadelphia. We most willingly give place to Mr. Young, and are much pleased to find that the little instrument is kept on sale in America by Mr. Thomas H. M'Collin, of Philadelphia.

A.—There are certain kinds of pyroxyline which form collodion of such a character that the films produced by them are soluble in strong alcohol, and such pyroxyline must have been employed in making the collodion with which your plates were prepared. The only remedy consists in applying a coating of weak gum water or diluted albumen to the negative previous to varnishing it. We have frequently cured varnish of its film-dissolving propensity by adding to it a little water, in the proportion of two or three drops to the ounce. This reduces the strength of the alcohol and prevents it from acting upon the collodion film. A varnish in which benzole is the solvent may also be used without any danger.

Sartor Resartus.—The red deposit on the shadows of the negative is caused by your not having washed it sufficiently after fixing. Try the following experiment:—Develope and fix two negatives in your usual manner; wash one very slightly and the other in a very thorough manner, aided, if you think proper, by the application of the solution of iodine of which you speak and which you say is very weak. Now proceed to intensify them by means of pyrogallic acid and silver, and note the effect produced. The probability is that, while the partially-washed plate will be so much stained and fogged as to be quite worthless, the other will be clean and brilliant.

B. Q. P.—The glycerine process is useful only in such cases as demand the exposure and development of a plate within a *few hours* after its preparation. When a plate is to be exposed about one hour after preparation no preservative will be required; but special precautions must be taken to prevent the collodion film from becoming dry. Among these precautions may be mentioned the careful wrapping up of the dark slide in a piece of india-rubber cloth or varnished paper; the placing of a moistened pad of blotting-paper behind the plate; and other observances of a like nature which will suggest themselves to an intelligent photographer. When a very long exposure in the camera is required, such as is sometimes necessitated by the photographing of dells, caverns, and similar subjects, a piece of dark-coloured cloth or flannel thoroughly moistened with water proves an efficient aid in the prevention of the plate becoming dry.

Received.—*Design and Work*, Part IV., and *The Young Ladies' Journal* for September.

Centennial Catalogue.—We are favoured by Mr. John Carbutt, the Superintendent of the Photographic Exhibition Hall, Centennial Exposition, Philadelphia, with a copy of the art catalogue of the exhibition. We are gratified to find in it the names of a large number of English exhibitors, and for the credit of this country we are further pleased to find among these names those recognised as holding the highest position on this side of the Atlantic.

Trade Catalogue.—We have received from Messrs. Mawson and Swan, of Newcastle-on-Tyne, their new *Illustrated Price List* of photographic apparatus, chemicals, and other requisites for the practice of photography. Its contents are of the most varied character, for it embraces everything that the most fastidious photographer can conceive as being necessary to the practice of his art, over twenty pages being devoted to the department of lenses by various makers. From this alone may be gathered the extent and completeness of the work, which in typography and general appearance is excellently got up.

Exhibition in Glasgow.—An exhibition of photographs will be held in Glasgow during the forthcoming meeting of the British Association, commencing on Wednesday, the 6th September next. Photographers are solicited to send specimens (framed or unframed) to Mr. D. Ferguson, Kelvin Grove Museum, Glasgow, not later than Monday next, the 28th inst. The carriage of photographs to and from the exhibition will be paid. We hope to personally witness a hearty response by the photographic public to the request put forth by the Glasgow committee. The meeting promises to be one of the most useful and popular of the large number held in connection with the British Association. For further particulars we refer to the advertisement in the usual pages.

APPLICATION FOR NEW PATENT.

August 22, 1876.—"A new or improved process and apparatus for producing photographic images upon glass, or glazed or enamelled articles." (Communicated by M. and R. Charbonnier.) No. 3298.—J. H. Johnson.

LONDON GAZETTE, *Tuesday, August* 22, 1876.

Partnership Dissolved.

Hum and Roberts, Birmingham, photographers.

METEOROLOGICAL REPORT,

For the Week ending August 23, 1876.

Observations taken at 406, Strand, by J. H. Steward, Optician.

These Observations are Taken at 8 a.m.

August.	Bar.	Wind.	Wet Bulb.	Dry Bulb.	Max. Tem.	Min. Tem.	Remarks
17	30·06	E	62	66	84	60	Fine
18	29·95	E	66	72	73	63	Raining
19	29·93	E	66	72	76	64	Cloudy
21	29·90	SE	62	64	79	59	Dull
22	29·89	W	62	64	73	59	Dull
23	29·85	N	51	58	—	52	Fine

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THE BRITISH

JOURNAL OF PHOTOGRAPHY.

No. 852. Vol. XXIII.—SEPTEMBER 1, 1876.

REMOVING HYPOSULPHITE OF SODA FROM PRINTS.

Writers on photographic subjects are still living who have recommended as a *sine quâ non* in the production of stable, unfading prints the subjecting of such prints for forty-eight hours to the cleansing influence of a running stream; and some theorists are still to be met with who strongly advocate washing for twenty-four hours. The great majority of practical photographers, however, now believe that if a print has been properly fixed in a new and moderately-strong solution of hyposulphite of soda, followed by a moderate and not over-prolonged washing in water, the hyposulphite will be so effectually removed as to be undiscoverable by any of the ordinary tests. We have said a "*moderately*-strong" solution of hyposulphite of soda. We use this qualifying term advisedly. When recently conversing with Mr. W. M. Ayres on this subject, that gentleman, who has had larger experience in printing, toning, and fixing prints than most photographers, gave it as his opinion, founded on numerous experiments, that using a too strong solution of hyposulphite of soda defeats the intention of the manipulator who employs it thus strong; for, owing to the very strength and, consequently, "ropy" nature of the solution, it appears to be enabled to penetrate actively the pores of the paper in order to lay hold and effect the solution of those atoms of chloride of silver the total removal of which is so imperative. A freshly-made and rather weak solution of hyposulphite of soda, in the estimation of Mr. Ayres, effects the removal of the chloride in a more rapid and perfect manner than if the solution were saturated with the fixing salt. Of course it is quite possible to employ *too* weak a fixing bath—so weak, in fact, that it will not fix the print at all. This, we need scarcely observe, must be carefully guarded against. The decomposition that takes place by the addition of chloride of silver to hyposulphite of soda yields hyposulphite of silver as a result, and as this complex salt is soluble in hyposulphite of soda it is reasonable to presume that this latter salt must be present in such excess as to effect the solution in question. If this be not the case, then measly, rapidly-fading prints will most assuredly be the reward of thus permitting parsimony to have undue influence in this operation. The action here alluded to as resulting from the use of a too weak solution of the fixing agent is different from that which occurs in connection with a stronger solution *plus* the addition of nitrate or chloride of silver. This causes a formation of tetrathionate of soda, which, as every *old* photographer is aware, is a toning agent of great power. Indeed, prior to the introduction of gold toning the salt just named was the active agent in producing "tone" in a photograph. Its toning action depended upon the formation of sulphide of silver—a substance of a very agreeable black colour, and one which, we may add, is very stable.

But it is with the removal of the hyposulphite from the print after it has done its work rather than with its reactions with the salts of silver we have to do at present. Prolonged washing will effect this end without doubt; but a prolonged washing is sometimes highly inexpedient. Means have been adopted to cause the decomposition of the hyposulphite into another body more easily dissolved in water and less likely to injure the prints, even if not perfectly removed, the principal among these being peroxide of hydrogen. For various reasons none of these eliminating agents have found favour with photographers.

A few days ago we examined with great care several photographs on albumenised paper, which had been printed by Mr. Edward Viles in 1871, and bearing the date of September of that year. They possessed all the vigour and purity of prints which had been recently removed from the washing tray, and yet all the amount of washing which these prints received might be correctly described as a mere rinsing; certainly they did not receive a *washing* in the usual significance of that term as applied to silver prints. The process employed by Mr. Viles is one published by Mr. H. J. Newton in the *Photographic World*, and which does not appear to be much known, or, at least, much practised, in this country. Whatever be the defects in principle which may afterwards be found, we must insist strongly upon the fact that during five years they have undergone no change that is appreciable. The method adopted by Mr. Viles is as follows:—

A strong solution of acetate of lead (the sugar of lead of commerce) is prepared by dissolving two ounces of this salt in sixteen ounces of hot water. This is kept as a stock solution. The prints, having been removed from the fixing bath, are rinsed in three or four changes of water and then transferred to a vessel containing four quarts of water and two ounces of the lead solution out of the stock bottle. Great care must be taken not to make the lead solution stronger than is here indicated, as it has a decided toning action, not only making the prints of a blacker tone than is desirable, but seriously impairing their beauty and brilliancy. The strength above given was found by Mr. Newton to be that by which the finest effects were produced, adding to the brilliancy by giving depth to the tone and preserving the purity of the whites. As soon as the prints are immersed the water becomes of a milky appearance, caused by the decomposition of the hyposulphite and the formation of the insoluble sulphate of lead, which can be removed from the surface of the print by a subsequent washing or sponging.

In this way prints have been washed in ten minutes in a manner which, so far as can be ascertained, is not inferior to that involving soaking in water for many hours. It may be added that the toning need not be carried quite so far as required in ordinary practice, because, as we have already observed, the lead carries on the toning to a slight extent. This power, however, should not be brought too frequently into requisition; for, although good tones may be obtained without any gold, such tones are not permanent. Those desirous of trying Mr. Newton's method of eliminating hyposulphite of soda, and who have not acetate of lead at command, may use the nitrate of lead as a substitute.

HALF-TONE IN EMULSION NEGATIVES.

As if to lend additional force to the remarks contained in our article upon alkaline development last week we received, after that article was written, the communication of "W. H. F.," which appeared at page 406, and which makes mention of a subject worthy of more than passing notice. The writer's ground of complaint is that, in spite of the many advantages of the washed emulsion process, one insuperable obstacle exists which must prevent its general adoption,

namely, its inability to render half-tone. Now, while agreeing so far with "W. H. F." as to believe in the existence of such a difficulty in connection with dry plates generally, we must at once join issue with him when he supposes that the defect is peculiar to the washed emulsion, or, indeed, any other method, or that it is owing to any weakness in the process itself. It will be our object in the course of the present article to consider the various conditions which operate to produce a different result upon wet and dry plates, and we trust we may be able to assist "W. H. F." out of his difficulty by showing him in which direction to search for the cure.

We need scarcely reiterate the well-known fact than an iron-developed wet plate, which is usually accepted as the standard of quality in negatives, differs widely in appearance from almost every description of dry plates ever tried; but while we acknowledge the existence of this difference it appears strange that no effort is made to explain it, and to improve the class of image obtainable on dry plates. Personally we are not of that class who believe that dry-plate results are necessarily inferior to wet; on the contrary, there are points in connection with dry plates which rather lead us to the belief that superiority should be with the former. Yet, at the same time, it would be idle to shut our eyes to the fact that inferior results are produced, and will continue to be produced, simply because the development and general management of dry plates is more difficult than the ordinary wet-plate manipulation. Hence it arises that the *ordinary* amateur turns out inferior work, and is content to believe it the best that can be obtained by the process; whereas the more intelligent artist recognises the difficulties, battles with them, and refuses to be satisfied with results which are not, technically at least, perfect. As a matter of fact, it is well known that the dry-plate work of some of our leading amateurs will bear very favourable comparison with even the best wet work, though it must be owned that instances of such excellence are rare; still it shows that improvement is possible.

In looking for the various causes which produce the difference of result we must consider in what respect the circumstances differ in the two cases. It is not, however, necessary to take particular notice of the minor points of divergence, such as the physical properties of the film or the presence of certain organic substances; these in themselves would be amply sufficient to produce a difference, but not such as the one we are inquiring into. The difficulty is one more purely of manipulation, and, therefore, more easily overcome, and may, we think, be safely traced to the development.

Let us consider for a moment the principle of the two forms of development most commonly employed, namely, silver and alkaline. In silver development we make no distinction between iron and pyro.; the image is formed by the deposition of metallic silver upon the impressed film, which undergoes no visible change itself. By keeping up the supply of silver in the developing solution the image may be gradually strengthened, or "built up," to any degree of density. Alkaline pyro., on the contrary, forms the image at the expense of the silver contained in the film, which, as may easily be proved, is reduced. One point is obvious—there can be no building up of an image by this method; the impression is formed by the change of state of the silver present, which is limited; hence, a certain point reached it is impossible to go further without injury.

Another point of distinction between the two methods lies in the fact that with alkaline pyro. the development is continuous—that is to say, detail and half-tones continue to appear and gain strength as long as the solution is applied or until the maximum effect is produced; but with silver development the case is different, for as soon as the film is washed and intensification commenced development proper ceases, the subsequent effect being merely the increase in strength of the image already developed, and not the creation of additional details. Here we have two diametrically opposite actions; for, in the first case, the development continues and detail is produced long after the high lights have become incapable of further change, while in the other it is the lights which continue to progress after the weaker portions have become stationary or nearly so.

By adapting these views to the case in point it is easy to account for the result complained of by "W. H. F.," namely, want of half-tone. It simply amounts to this—that by employing alkaline pyro. for the intensification the half-tones are rendered of equal value with the lights. There cannot be the slightest question as to the best form of development for emulsion or, indeed, most other dry plates. The palm must certainly be given to alkaline pyro.; but we must repeat what we have previously expressed, a preference for silver intensification. This preference, we are glad to see, is rapidly gaining ground as photographers begin to realise the fact that, though it is comfortable and convenient to use plates which work up to full density without silver, the best results are only to be obtained with silver intensification.

Under certain circumstances we are willing to believe that alkaline intensification is not only allowable but advantageous; but as a rule, and under all ordinary conditions, "W. H. F." and others will find it by far the best plan to resort to the use of silver.

IRON.

It is said that "familiarity breeds contempt," but "carelessness" would, we think, be a better word. There is probably no word so often in the mouth or the mind of a photographer as the one that heads this article, applied in its technical sense to the protosulphate; and yet we have no doubt there are many who handle it almost constantly during the working hours of every day that rarely take the trouble to think how it is that it answers their purpose so admirably, or what, during a busy season, they should do if they were confined to the tedious pyrogallic acid development.

It is not an uncommon thing to hear an enthusiastic photographer, in speaking of some very fine negative, wind up his laudatory observations by the statement that "it has all the bloom and delicate beauty of pyrogallic development." We are inclined to think, however, that such a statement is an illustration of the old adage, "Distance lends enchantment to the view;" and that if those who make it would take the trouble to examine some of the old negatives developed by pyrogallic acid they would find them, as a rule, sadly deficient in that delicate gradation which all good negatives must possess. The fact is that in the days of pyrogallic development we were more easily pleased than now, and time, with its happy power of eliminating much that in the past was disagreeable, has left us only the pleasurable recollections of success.

But not only are properly-developed "iron negatives" finer than those by pyrogallic acid—they are, what to a busy photographer is of almost as much importance, obtained in very much less time. As this is apt to be forgotten by those who at one time used pyrogallic acid, and not fully appreciated by those whose experience has been confined to iron, we, with some care, made a few experiments with a view to ascertain as accurately as possible the relative time required by the two developers, and are fully satisfied that a plate to be developed with pyrogallic acid, containing just sufficient acid to confine the deposit to the portions affected by light, must receive as nearly as may be an exposure fifty per cent. longer than on that to be developed with iron. In portraiture this is a matter of great importance; and not much less important is the fact that the difference in the time occupied in the act of development is still greater, the pyrogallic acid requiring on an average five times longer than an ordinary fifteen-grain solution of iron to bring out as much detail and suitable density on a fully-exposed plate.

Our attention has been turned to this subject in consequence of an opportunity we recently embraced of paying a visit to a chemical manufactory where green vitriol is produced to the extent of a ton per week. Very pure sulphate of iron, as is well known, may be formed by the action of sulphuric acid on iron, preferably in the form of fine wire; and the re-arrangement of the atoms may be simply represented by the following equation:—$H_2SO_4 + Fe = FeSO_4 + H_2$, in which the two atoms of hydrogen are replaced by one atom of iron, the salt at the instant of formation taking up seven atoms of water; so its true formula is $FeSO_4, 7H_2O$.

Commercially, sulphate of iron is, we understand, generally made as we saw it manufactured during the visit referred to. Natural

bisulphide of iron, or iron pyrites ($Fe\ S_2$), after being slightly roasted, is piled into *bings* or heaps and freely exposed to the air and moisture, water being plentifully supplied in the absence of rain. By a process of oxidation the sulphur is converted into sulphuric acid, the iron into ferrous oxide, and those two bodies acting on each other give rise to the formation of ferrous sulphate. As we saw the operation it was somewhat more complicated. Mixed with the pyrites there was a considerable quantity of clay, and as the amount of acid formed was much more than sufficient to combine with the ferrous oxide, the remainder combined with the alumina of the clay to form alumina sulphate. When the process of oxidation had gone far enough water was passed through the mass to dissolve the sulphates, and was run into large leaden evaporating vessels for concentration, and then into lead-lined crystallising cisterns, where the iron sulphate crystallised out, leaving the alumina sulphate in solution. This was subsequently, by the addition of potass, converted into ordinary alum. Ferrous sulphate for photographic purposes is recrystallised, and with a view to its keeping qualities, we are informed, generally from acid solutions.

The so-called pure iron sulphate is found in the market in differeut states—first, a nearly pure ferrous sulphate crystallised from an acid solution, and of a blue, slightly greenish colour; second, that got from neutral liquors, of a pale bluish-green, and generally containing traces of ferric sulphate; and, third, a variety of an emerald green colour, which is, in reality, a compound of ferrous and ferric sulphates.

Of the three varieties the first, although the prettiest and the one that keeps best, is the least suitable for development. Careful experiment showed us that, *cœteris paribus*, it failed even after prolonged action to give as much detail as either of the other two. This may be due to the presence of free sulphuric acid, which, as is well known, powerfully retards reduction. The second and third varieties readily combine with the oxygen of the air, and at ordinary temperatures form basic ferric sulphates and become *rusty*, but should not on this account be discarded, as the basic oxide being insoluble is easily filtered out of a solution. When either of the varieties are kept in solution for some time oxygen is taken up and a portion of the ferrous sulphate, $Fe\ SO_4$, becomes $Fe_2\ (SO_4)_3$, ferric oxide. The solution in this state is undoubtedly better for certain purposes—such as the development of transparencies, where the lights should be clean glass, or in copying maps or engravings, where the lines should be free from deposit—than an unaltered solution of pure ferrous sulphate. Why it should be so is not very clearly understood; but we have made a quantity of solution of ferric sulphate by boiling the ferrous salt with excess of sulphuric acid and the addition of nitric acid, and shall, after some experiments, resume the subject, if any useful information can be gleaned.

Aware of the conservative power of saccharine matter, as exemplified in the *saccharine carbonate of iron* of the *Pharmacopœia*, and probably anxious to introduce organic matter into the developer, somebody recommended the formation of a saccharine sulphate of iron; and for some time it met with favour, but we suppose it has been long since abandoned. The double sulphate of iron and ammonia has, however, held its ground, and is still rather largely used. So far as the beauty of the crystals is concerned it undoubtedly exerts a beneficial influence; but, even if it were desirable, we hardly think it prevents the formation of ferric sulphate in the solution. A careful series of experiments have forced us to the conclusion that as an addition to the developer it is practically inert, and may safely be discarded as a useless complication.

In connection with our remarks a few weeks ago on the subject of the artistic improvement of negatives, one or two complaints have reached us that, in working upon the paper stretched upon the negative, it is frequently difficult to produce a sufficient effect, the pencil failing, apparently, to "take" to the surface. When such a state of affairs exists it is tolerably plain that either the pencil or the paper are not suited to the purpose; for with a good Faber pencil, not too soft, sufficient depth of colour may be obtained, even when using a bad sample of paper, or when working upon the slightly-roughened surface of the varnished film. A simple plan of removing the difficulty, which may possibly be new to some of our readers, consists in rubbing the surface of the paper, previous to retouching, with a tuft of clean cotton-wool upon which a little powdered resin has been sprinkled. This gives a sort of tooth to the surface very well adapted to receive the pencil. For masking large masses of shadow, a mixture of powdered plumbago or crayon with resin may be applied with a stump, taking care not to employ too much resin. The latter may be obtained in a finely-pulverised state from any druggist. It is necessary to exercise great care and cleanliness, as the resin, if too much be used, will attract any particles of dust that may come near it.

THE PREPARATION OF BACKGROUNDS.

Every photographer has his own ideas about backgrounds, and his own hobbies and fancies with regard to the proper mode of producing them. I propose in this article to describe the plan I adopt to obtain these important and essential adjuncts to the studio, and some of my experiences in connection with backgrounds.

I am treating of plain—that is, non-pictorial—backgrounds only. Landscape and interiors, even when drawn by the hand of a master, are articles of most questionable value, and when produced amateur fashion are simply detestable. Of all things painful to look upon is there one more miserable than a wretched picture exhibited behind an average specimen of an Englishman, without regard to æsthetic propriety or artistic unity? I confess to having seen some very beautiful and artistic portraits where the background really formed part of the picture; but for one such satisfactory result a thousand of an opposite kind could be shown, and the men who do this good work employ talented scenic artists, who work by their own rules and have had a long apprenticeship to the use of the brush.

It will be remembered that a young gentleman was once brought to Sir Joshua Reynolds as a candidate for the position of pupil-assistant. First, what could he do? the great painter asked. And when this query elicited the response that the intending pupil announced his abilty to paint-in backgrounds and that sort of thing for the portraits executed by the great master—" O dear no," said Sir Joshua; " I always paint my own backgrounds in." In a minor path I hold it to be the case that every photographer should esteem it a matter of prime importance that there be no discordance visible between the figure and its surroundings in a photographic portrait. For this reason I am a thorough advocate for the use generally of non-pictorial backgrounds in the studio. It is true that to have a figure apparently inlaid into a flat, even patch of monotone, guiltless of shadow or irregularity, is very inartistic and poor; yet, feeble as it is, it is immeasurably above the atrocious " pictorial " contradictions I have alluded to.

It would seem a matter sufficiently simple to paint a plain background the shadows or unevenness on which were to be afterwards obtained while arranging the sitter; and so, indeed, has thought each one of the large number of painters who, at one time or another, have worked to my instructions. I must here candidly state that I consider it cheaper and better in every way for a photographer to call in the aid of a painter than to do his own painting, unless his studio and the work he has to do in it be of a most elementary description. But even when a professed painter takes the commission in hand my experience is that it is but the beginning of troubles. Few things about the studio have caused me so much annoyance as these apparently trifling accessories.

But not to anticipate, I may first speak of the form the background is to assume so as to ensure a sufficient variety of effect. Many employ a set of roller backgrounds, of different tints, to suit the dress or the particular style of effect to be produced; and this form is a very useful one, but it has several grave defects. In the first place, unless there be several sets, the sitter is restricted to one particular spot in the studio. This I consider a great disadvantage, as one so often sees from a point to one or other side of the camera a particular aspect of the sitter that strikes us as being a desirable and suitable one, but which could not be taken from the special point of view, owing to the background being awkwardly placed. The latter is immovable. To move the sitter would spoil all; and so, perforce, we often lose many a striking pose or beautiful arrangement of folds. Then, again: if to the experienced eye the whole tone of the suspended sheet seems too light or too dark when all is arranged, it is a great waste of time and a great trial to the sitter's nerves and patience to wait while the scene-shifting goes

on behind. For this reason I have for the last half-dozen years entirely discarded all pulley arrangements, and use only large frameworks mounted on castors with a different tint on each side, while for group or other purposes the whole end of the studio is made one even tint from side to side, the lighting arrangements for the sitter breaking up, to a great extent, the monotonous effect it would otherwise produce.

The screens are made in the following manner:—A stout inch and a-half framework, strengthened by two horizontal cross-pieces, has attached to its base at right angles two strong wooden bars kept firmly in their place by side-struts; a set of castors—one at each of the four ends of the wooden bars—completes the arrangement, which is so light and handy that it can be moved from end to end of the studio with the utmost facility and adjusted to any angle with regard to the light, or any spot in the room that I choose to place my sitter in, and this can be done, if necessary, without requiring anyone to aid in moving the screen. Some artists adopt a somewhat similar plan by having a rigid framework—movable, not by castors, but by sheer lifting—two being required to work it and to fix it in its place by means of huge heavy blocks.

The point which next arises is the covering to be made use of for receiving the paint. My first experience was with one of the usual plain grounds, well nailed on. It was all right for a while, but it soon began to bag and belly out and to give, according to the state of the atmosphere, to such an extent as to produce all sorts of irregular patches—a want of evenness, though very well when kept under bounds, being excessively annoying when it makes its appearance unbidden, perhaps in the spot where it is least needed. My next effort was to get strained some thick canvas and to paint it after straining. This was as bad as the other. I then got a single coating of paper on one side and had it oil-painted to destroy its porosity, and then coloured in distemper. That was a very great improvement; but one and all these were liable to continued injury from thoughtless sitters' elbows and fingers, but, above all, from occasional bumps with the head-rest, which got knocked against it at all sorts of inopportune moments. If these thrusts were at all severe the screen got permanently dinted and gradually rendered useless, the head-rest being an especial source of danger. Finally: I had them covered with canvas, and then covered and re-covered with layer after layer of paper till they became as tight as a drum and nearly as hard as cardboard. The painting then became the only uncertain point; painter after painter tried his hand, but all to no purpose. "Tempera" or "turpentine flatting" was almost always a failure; in the former the paint dried unevenly as to colour, and in the latter uneven as to surface.

I have had one man, two men, three men, all at one time on the same side, and still failure has resulted. The method finally adopted was to have it done in "turpentine flatting," three men starting at the top and working downwards, with a fourth to dab it with a large stippler. Now that, after a multitude of experiments at my expense, they have got into the knack of the thing they can do it without trouble and can repeat the colouring any time.

The colour I adopt is a simple mixture of white and blue-black. These colours are usually so very nearly uniform that when from any cause a new painting is required there need be no matching or mixing of pigments. I can also be sure of having exactly what I want, and I feel the satisfaction of knowing the sort of tool I am working with. G. Watmough Webster, F.C.S.

ON THE PREPARATION AND COLOURING OF TRANSPARENCIES FOR THE MAGIC LANTERN.

Chapter III.—The Slide—*(Continued)*.

The application of varnish before colouring may be quite suitable for varnish colours, but not for water colours. I have seen slides issued by eminent firms in which the colours were run in this way—the hair colour down upon the face, and arms and legs coloured with a beautiful blue or green, whichever happened to be the colour of the dress. As I believe this is one of the great difficulties with those desirous of colouring slides, I may say it cost me many a thought before I arrived at a satisfactory solution.

The slide must be protected, as the collodion film is too tender to stand colouring upon; at the same time it must be protected by a coating that will not be moved when varnished after colouring, and the coating must be suitable for working on in water colours. These qualities are all found in our old friend, albumen. Make up a solution of albumen in a bottle, adding two ounces of water for one ounce of albumen; shake well up with bits of broken glass in the bottle and filter through cotton-wool, or, what is better, common tow or lamb's wool, put into the neck of the filter, and, the albumen having passed through, it is now ready for use. After having intensified and blackened the slide *while still wet*, and having washed, of course, pour the albumen over the slide, in the same manner as coating with collodion, avoiding air-bells. Do this twice, as the first flow merely carries off the surface water and the second coats the plate. When coating the plate with the albumen pour the surplus back into the original bottle from which it was filtered, so that when bottle No. 2 is empty it may be filtered back again from bottle No. 1 to bottle No. 2, and thus avoid dust or air-bells.

When the slides are all coated they are to be "roasted," as I call it; that is to say, they are to be dried before the fire, and then laid on their backs on the top of a flat stove not too hot. If a stove be not at hand they may be heated before the fire on a toaster, say three or four minutes, until the albumen is coagulated. There is no danger of breakage by putting on the stove, if it be only moderately warm. One out of a hundred may be broken through over-heating the stove or from some flaw in the glass, and sometimes owing to a drop of water being still left on the slide; but if properly dried and put on the stove while still warm there is no danger of breaking. They must not be left too long before the fire or on the stove, as they may be "done brown," which will discolour the slide and affect the appearance of the colouring. In lifting the slide from the fire use a small piece of rag or chamois leather, as, if the heated glass be touched with cold fingers, it will break at once.

Having allowed the slides to cool they are now ready for the artist, who will find an agreeable surface to work upon, and one which will allow a good deal of freedom; but it has its limits, and the sooner this is found the better, as the artist will then know exactly how much the albumen surface will stand, and will be careful to use only suitable brushes for this purpose. After the slide is coloured the spirit varnish used will only make the surface all the firmer, so that the finest lines of colour remain exactly in their places, and are as perfectly sharp as when first laid on. Coagulation of the albumen surface may be effected in other ways, such as with hot water or with alcohol; but I prefer the above method as being the cleanest and most simple, and there is not the liability of the albumen being removed from one part of the plate to another, and no mess or skittle.

The above remarks or instructions, so far as the blackening of the negative and the slide and the albumenised surface for colouring upon are concerned, apply equally to the dry process as to the wet, in which I have avoided any technical details or quantities, so that all may practise the method with which they are best acquainted.

Chapter IV.—Colouring.

As the artist in colouring these slides can now proceed exactly as if he or she were colouring a *carte* having an albumen surface to work upon, no difficulty will be found in the application of the colours, which, however, must all be transparent, and the colouring must be done by transmitted light instead of the reflected light, as in colouring *cartes* or other pictures on paper. The following is a list of the colours used, which will be found quite transparent and all that are required. Many colours called "transparent," for use in water-colour painting on paper, will be found useless when used for painting on glass:—

Prussian blue,	Rose madder,
Prussian green,	Crimson lake,
Italian pink,	Burnt sienna,
Brown pink,	Purple madder,
Brown madder,	Deep rose,
Sepia,	Dahlia carmine,
Payne's grey,	Lampblack.

Many other different colours may be produced by the mixture of any two of the colours in the list. For skin tint use—

Rose madder and Italian pink for ladies and children of fair complexion.

Rose madder and burnt sienna for male figures and dark complexions.

Prussian blue and Italian pink for green draperies and trees of a bright green.

Prussian blue* and rose madder—beautiful shades of purple for draperies and distant hills.

Rose madder* and warm sepia for draperies of a warm-brown tone, and for trunks of trees.

The above examples are sufficient to guide the artist of taste, and suggest unlimited scope as to the tints that may be produced.

A porcelain palette is to be used, and a small quantity of each tint required rubbed down, which may be allowed to dry. The

* Mix the colours with pure water only; avoid using gum or any other vehicle.

colours I prefer are the cake colours manufactured by Messrs. Winsor and Newton, which, for purity and brilliancy, I find perfect in every way required.

Brushes.—Use sable brushes for laying on the colours. Three different sizes will be required—one large, about the thickness of a drawing pencil; one medium size; and one fine brush for details. These brushes require to be long in the hair, and to have fine tapering points. One or two dabbers are also required. These are simply made from common camel's-hair pencils. Two or three different sizes, for large or small work, may be made in this manner:—Select the sizes required, and roll a piece of note-paper round the brush, leaving as much of the brush point exposed as it is desired to cut away. Put this point in the flame of the gas until it burns the hair down to the paper; rub off the burnt part with the finger, and give it another slight touch to make it perfectly flat, and the dabber is made. If the point were cut off with a knife the sharp cut hair would scratch the surface of the slide; but, being burnt, each hair is rounded off in the point, and is quite safe to work with.

This tool will be found very useful for stippling skies and trees; but it must not be used for everything, as a beginner might be tempted to do from the easy manner in which the colours may be levelled down. It is found most useful in landscapes or backgrounds, but must never be used for figures or drapery.

It is sometimes recommended to work on a sloping desk, with a hole cut in the centre and a reflector underneath, the same as a retouching-desk; but I prefer and recommend a flat table to work upon, the reflector used being a clean white mount or sheet of pasteboard, the slide being held in a sloping position, and the light falling upon the mount or reflector from a window or gaslight in front. The advantage of working at a flat table is this:—When an even layer of colour has been obtained, such as in skies or draperies, the slide may be laid flat down for a minute or so (which will be sufficient) until the colour sets. THOMAS ROSS.

NOTES ON PASSING EVENTS.

By a Peripatetic Photographer.

In the course of a review of the *Scenograph Manual,* which appeared in this Journal a fortnight ago, the Editors speak of the lightness and simplicity of the double dark slide of that instrument. I am sure that if they were to devote a very brief article to a detailed description of the slide they would confer a great benefit upon those of their readers who, like myself, feel that there is a great deal of unnecessary wood, workmanship, and expense in the best double slides of the present period. Surely there exists no necessity of making them in such an elaborate manner as to entail an expenditure of twenty or thirty shillings, or even more, for the privilege of carrying two plates of glass away from home and placing them in the camera without their being acted on by light. For this reason I believe that many would welcome any hints concerning the simplification of the double dark slide.

Is there no possibility for poor mortals of the everyday class of photographer being privileged to look upon any of the much-vaunted polychromes of M. Leon Vidal? I remember when, a few years ago, the late Mr. Sutton was French correspondent of this Journal, that gentleman obtained and transmitted to London for examination several specimens of polychromy, one of which, on application at the office of this Journal, I was permitted to examine. But it has been averred that since that time changes have been introduced and improvements effected, yet notwithstanding, it is not possible for any individual in this country to gratify a very natural longing by being allowed the chance of gazing upon one of those much-vaunted specimens of photography in colours. Should this fall under the eye of Professor Stebbing, your Paris correspondent, or of M. Leon Vidal, the inventor of the process of photopolychromy, either of these gentlemen may consider it to be not above his notice to forward to the publishing office of this Journal one or more of such specimens recently produced. The act would be greatly appreciated by numerous members of the fraternity who are interested in the process, but who have not been afforded an opportunity of seeing the pictorial results.

I have recently seen paper negatives the texture of which is so fine as to enable prints to be obtained quite free from all granularity, almost as much so as if the negative were on a collodion film supported on a glass plate. How are these done? There is no difficulty whatever in printing negatives upon paper, a sheet of sensitive albumenised paper and a deep-toned transparency plainly enough form the means of obtaining these in the utmost beauty and vigour. But now comes the difficulty: how is the paper to be treated so as to be made translucent and free from a coarse grain? *That* is the question. Among experiments that have been tried to effect this much-desired end is the immersion of the negative in melted wax, with subsequent blotting-off by bibulous paper on the top of a hot iron plate—a method which makes the picture rather more transparent than it was, but which also causes a good deal of granulation in the paper, too much so to render it of use for the purpose intended. A second method has been tried by treating the paper with a solution of wax in turpentine, both paper and solution being well warmed previous to the application. This answers a little better than the preceding, but it is still far from giving the results required. A solution of Canadian balsam in turpentine produced a much better result, and when benzole was substituted for the turpentine the improvement was still more marked. But to secure the full benefits of this application the size must be removed from the paper, which can be done without disturbing the albumen film, and numerous applications of the benzole varnish must be made, the subjection of the paper to heat proving a means of facilitating its penetration. For various reasons, however, I rather dislike the balsam, and have now gone in quite another direction with a considerable degree of success. My experiments are still in too incomplete a state to warrant me in bringing them forward at present. It is a subject that, in my estimation, will bear much discussion in the Journal.

Considering the plethora of optical articles that have recently been appearing in these pages as the outcome of two tolerably well-known American gentlemen who have been giving us platform utterances, the readers of the Journal ought now to be very wise indeed in relation to such matters. It, however, occurs to me to suggest that an exhaustive lecture, or series of articles, on the nature and construction of the photographic lenses of the year of grace 1876 would prove far more interesting than treatises on abstract optics—such a treatise as would let us all know, for example, the difference between the rapid "non-such" of Smith, the rapid "fail-me-never" of Jones, the rapid "*ne plus ultra*" of Brown, and the rapid "screamer" of Robinson, giving us diagrams and descriptions that we might know wherein consists the difference between Pompey and Cæsar, which every student of the manners and customs of our sable brethren knows are "bery much alike, 'specially Pompey." Such a treatise, containing practical everyday matters of fact relating to lenses, could not fail to be very useful. Something of this kind appeared in one of the former volumes of this Journal; but that was long ago, and many changes have taken place since that time.

Things are certainly arriving at a state of perfection when we find it announced that a periodical is about to be started on the continent in which photographic illustrations and typography are to be printed simultaneously. To do this, if the photograph were merely a reproduction of a pen-and-ink drawing, would not only be a matter of comparative ease, but is what is done almost every day; for it is well known that there are in London several establishments where little of any other business is carried on than the production of surface blocks of line subjects from photographs. But in subjects from nature, containing pure half-tone, the difficulty will be greater. If the illustrations be produced by *lichtdruck*, or one or the other of the processes which necessitate printing from a gelatine surface, in a manner similar to lithography, the slowness with which the printing is effected will prove detrimental; while if the printing be done from *raised* blocks and types there is a danger of the half-tones being imperfect and the shadows clogged. Still, if something be sacrificed in respect of quality, there is no doubt that photographs may be printed at a typographic machine, much care being taken with the "making ready" of the block. A good process by which blocks suitable for this purpose may be produced consists in giving a transparency a very thick coating of bichromatised gelatine, and, after drying, exposing to light through the transparency, afterwards washing with hot water, and taking an electro cast from the picture in relief obtained as the result of the foregoing operations. But, as I have said, great care will be required in the "making up" of this block by the printer.

When I see the immense number of albums, paintings, mugs, jugs, and goblets that are annually distributed among the members of the Amateur Photographic Association I neither associate this with a Mutual Admiration Society nor a Mutual Presentation Society; but I *do* think that the number of members who have been long in that happy body without receiving either a prize or certificate of honourable mention is not very numerous.

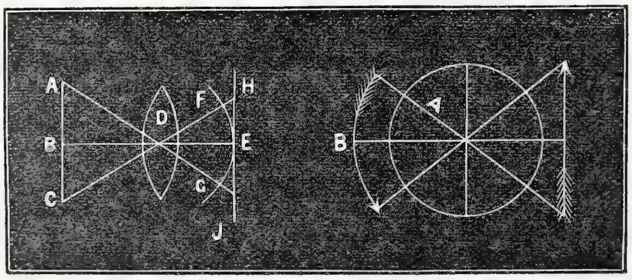
After reading the account of the new camera introduced by Mr. W. A. Brice, I ask myself—In what respect is it superior to a

camera of the Newton class, in which one of a series of vertical baths is brought, by means of sliding, under a slot in the bottom of the camera, through which slot the plate is lowered down to be sensitised or developed, as the case may be? It seems to resolve itself into a question of the comparative advantages of sensitising and developing in a flat *versus* a dipping bath—a question on which, as regards *small* plates, photographers have long ago made up their minds. The new instrument appears to be somewhat complicated, and will, for this reason, prove to be more costly in construction than wet-plate field cameras of other kinds; while, judging from the drawing and description given, it will be somewhat bulky for the size of plate to be manipulated. What special advantage, may I inquire, is claimed for the new form of camera?

ON LENSES.*

We now come to another aberration of a lens, the curvature of field. The image of a flat object, formed by a lens, cannot be received on a plane screen; the screen ought to be concave. A, B, and C (*fig.* 14), are very distant points, and, therefore, nearly equidistant from the lens D, of which the point B is situated in the line of the axis of the lens, while the points A and C are above and below the axis. It is evident that the images of these points are formed at nearly equal distances from the optical centre, not far from the principal focus. The field F E G is, therefore, curved, and cannot be received on the screen H I equally sharp. The curvature of the field is generally

FIG. 14. FIG. 15.



attributed to spherical aberration; sometimes it is even thought to be spherical aberration itself, but it has nothing to do with it. If lenses could be made with parabolic curves, free of spherical aberration, the curvature of field would be about the same.

Suppose we have a globular lens A (*fig.* 15), with a diaphragm in the middle, so small as to reduce spherical aberration to almost nothing. Now we know that the focus of a sphere of crown glass is situated a quarter of the diameter behind the globe, at B, and, as all the pencils are normal, they all will form their image a quarter of the diameter of the globe behind it; that is, the image lies in a curve concentric with the lens, although the spherical aberration is not perceptible. To understand the correction of the curvature of the field we must make clear what is meant by depth of focus and what the effect of a diaphragm is. Depth of focus is the property of a lens to give a tolerably clear image of objects not in one plane. *Figs.* 16 and 17 will make it plain. In *fig.* 16 we make use of the whole aperture of a lens D; R R are parallel rays striking the margin of the lens. The image is formed at a screen A; if the screen be moved to B or C the image of the point *a* spreads out, because

FIG. 16. FIG. 18.

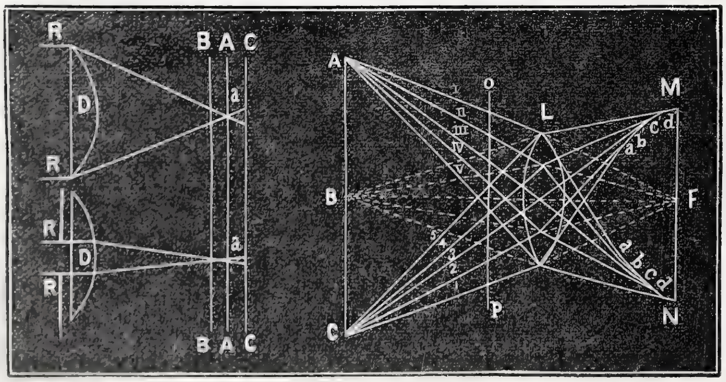
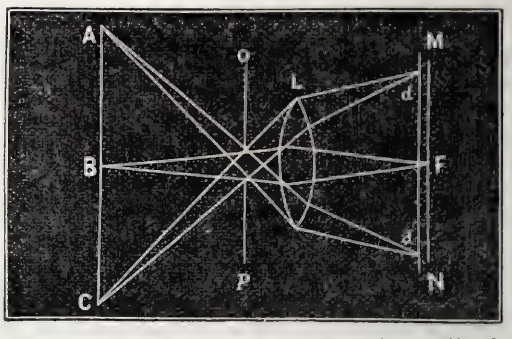


FIG. 17.

the angle of the crossing rays is large. When the same lens D (*fig.* 17) is provided with a diaphragm, so as to reduce the aperture considerably, the focus of the rays R R is still at *a*. If we now move the screen the same distance as before to C or D we find that the image of the point *a* is considerably reduced. If we now look at *fig.* 14, we see that only E can be sharp on the screen, and if the screen be moved towards the lens until the points F and G are sharply defined upon it, then the point E will lie beyond the screen and become indistinct; but if we provide the lens with a small central diaphragm we can find a place for the screen, where all three points can be brought to it, without the images being sensibly diminished in sharpness.

Now let us see what takes place if we move the diaphragm to a proper distance from the lens. A B C (*fig.* 18) are distant points, L a converging lens. Let us trace the course of the rays, commencing from the points A B C. The rays from the points B situated in the axis and the image of the point B will be formed at F, the principal focus. But it is different with the rays coming from A and C. The rays proceeding from the point A—Ai, Aii, Aiii, Aiv, Av, are refracted to *a*, *b*, *c*, *d*, *e*; similarly the rays from the point C are refracted to *a'*, *b'*, *c'*, *d'*, *e'*, occasioning, as we have seen before, spherical aberration. If we place a screen at the principal focus F it will not receive a distinct image, even if we have a concave screen; as will be observed, all the rays outside of the axis arrive at different distances behind the lens. You notice that none but the rays Aiv, and Av, and C_4 and C_5, have their focus near the plane of the screen M N. Now if we find a place for a diaphragm, so that only these rays pass the lens, and the depth of the lens is as great as *d* M, we may expect a pretty sharp image on a plane screen. By looking over the figure we see that such a plane is in O P (*figs.* 18 and 19). A

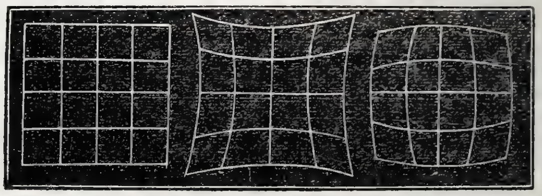
FIG. 19.



diaphragm in this place, and of the proper size, will allow only the most favourable rays to pass, and a tolerably flat and sharp image is obtained. The smaller the diaphragm the sharper and flatter the image. But, as we mentioned before, small diaphragms have the disadvantage that the light is cut off to such an extent; and for most purposes the lens becomes useless. But suppose we would employ a negative lens, under the same conditions, we would have no real image, but a virtual one, the curvature of the field would be reversed, and the marginal rays have a longer focus than the central ones. Therefore, it is possible to associate a negative with a positive lens, and to render the field flat.

The next aberration which we have to deal with is the distortion. If we describe a network of straight lines, and hold a convex lens

FIG. 20.



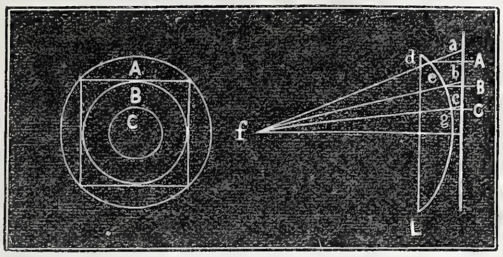
over it, placing the eye at a distance from it in the axis of the lens, only the two right angle lines of the centre appear straight; the others appear curved. When the upper is in the reverse position to the lower one they appear pincushion-shaped. When distortion of the negative lens is reversed the lines appear as the curved sides of a barrel.

The cause of distortion is somewhat difficult to explain, but the following figures make it clear. Let us describe upon a plate or plane surface a number of circles, A B C, equidistant from each other (*fig.* 21 in front view, and *fig.* 22 in profile), and place in front of them (*fig.* 22) the lens L. Now the rays which proceed from A B C, parallel to the axis of the lens, strike it at *d e g*, from whence they will be refracted and meet at *f*, the principal focus. If we place the eye at *f* we see the circle A—not where it really is, but in the direction *f d*; the circle B in the direction *f e*; and the circle C in the direction *f g*. By prolonging the lines of direction until they meet the plane of the circles A B C we observe that the

* Continued from page 390.

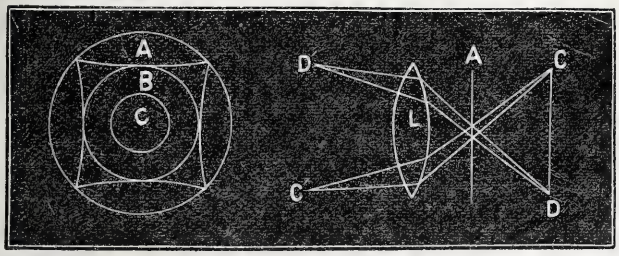
circles do not appear equally apart, but their distance is increasing from C to A; they will appear as in *fig.* 23.

FIG. 21. FIG 22.



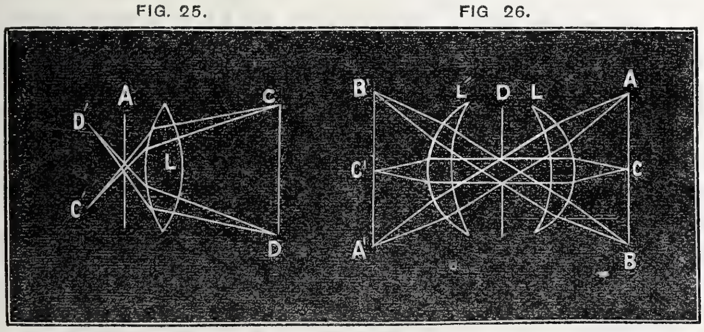
We will suppose for a moment that the circles A and B (*fig.* 21) are of such relative diameters that a square enclosing B, with its sides tangential, shall have its corners in the circle A. Now if we draw the circle A and B (*fig.* 23) (as they will *appear* from *f*) the distance between A and B will be greater or equal to *a b* (*fig.* 22), and, as the contact of the side of the square with B (tangentially), and with A at the ends, must be kept, the line of the side will now *appear* curved or bent (*fig.* 23).

FIG. 23. FIG. 24.



A single lens without distortion cannot be made; but, by combining two or more lenses in connection with diaphragms, in a certain position, the distortion may be corrected completely. If a diaphragm be placed in front of a lens L (*fig.* 24) different parts of the lens are employed to form different parts of the object C D. In this case the distortion is barrel-shaped; but, by placing the diaphragm behind the lens, as in *fig.* 25, the distortion is of the opposite nature —that is, pincushion-shaped. Rays coming from D (*fig.* 24) pass through the upper part of the lens; while in the latter, through the lower part.

FIG. 25. FIG 26.



Now you will readily see that by uniting two lenses equal to each other, L L′ (*fig.* 26), and placing a diaphragm D between them, it follows that the distortion accompanying the lens L, with its diaphragm behind it, is corrected by the action of the same diaphragm upon the rays entering the lens L′, where the diaphragm is now in front of the lens L. The modern photographic objectives to be used for architectural work and copying are constructed on this principle.

Unfortunately, this advantage is obtained at the sacrifice of aperture—that is, of light. I mentioned before that the negative lens has the opposite distortion of the positive lens, so that by proper combination of lenses of suitable curves material distortion can nearly be overcome upon a limited field.

Photographic objectives used for portrait purposes, when a large quantity of light is desirable for brief exposure, are thus corrected; but these are again open to the fault of a restricted angle of vision. In all other lenses, when the light is the desirable element to be preserved, the correction of distortion must be made, as far as possible, by a combination of lenses. JOSEPH ZENTMAYER.

(To be concluded in our next.)

PHOTOGRAPHIC PORTRAITURE.

CHAPTER I.—SOME LESSONS FROM VANDYKE.

FROM the days of Henry VIII. to our own portraiture has been the most encouraged branch of English art. Not that any branch of art executed in England was ever greatly encouraged before the days to which it is our proud privilege to belong; but still of all the little patronage accorded to English painters by far the larger share was awarded to portrait painters. The hard, dry, conscientious and careful work of the early German school, as represented in this country by Holbein, made portraiture fashionable. We may see the flat, diagrammatical faces on which he laboured with such patient care in many a collection of old family portraits. His loving prejudices in favour of heavy jaws, small eyes, and large noses find expression, somehow or other, in all his faces—young or old, male or female—as those who have visited the Hampton Court collection must confess. The character of the man and the requirements of the patrons he worked for are clearly and distinctly traceable in all he did.

And that which is true of Holbein and his work is true of portraiture in all phases of its progress and development, and is not one whit the less true now, when that art has fallen so largely into the hands of photographers.

Queen Elizabeth wanted her portraits painted without shadows, and we all know how, in later days, precisely the same desire has been commonly expressed by patrons as ignorant of art and as little capable of appreciating its beauties as good Queen Bess was. Portraits as nearly as possible shadowless, with faces as hard, flat, and mosaic-like as old Holbein's worst productions, were common in the early days of photography, especially when the art passed into the glass positive stage and the first pictures on paper made their appearance. And these things were, in their origin, due purely to the uneducated taste of photographic patrons and photographic operators, although artists whose "wish was father to the thought" attributed it to the imperfect nature of the new art of sun-drawing, and critics refused to believe that it would ever be possible to produce works having any higher claims to their notice. We all know with what extreme rapidity the art of photographic portraiture improved, and we all know that it was due originally to photographic journalism—a source to which, indeed, most of the good things we now photographically enjoy may be either directly or indirectly traced.

What Holbein's productions were in the early times of English portrait painting—full of minute, map-like detail, but lacking the breadth, force, and grandeur which shone so resplendent in the works of Titian, Vandyke, and their later followers—photographic portraits were. But now we can point to many a professor of the "black art" whose portraits are as forcible and broad in their effects of light and shade, as rich in colour, as full of tender gradations of reflected and direct light, half-tones, and beautifully harmonised and graduated shadows as many of the great art works which we now have in our mind's eye.

But there is yet another stage of progress in an æsthetic direction to be mastered by portrait photographers. We want, as a rule, greater variety of treatment, more regard for individual characteristics, glass-room arrangements which enable us to experimentalise with our light and shade on living models as readily as if we had it on our palette or at the end of a brush or pencil before the painter's canvas. The wonderful gain newly made in rapidity of exposure should enable us to catch transient expressions of grace, beauty, and feeling, instead of the deadly formal stillness and fixed rigidity so necessary in the old long-exposure days. It is these things which ennoble the art of portraiture, raise it to a loftier standard of intellectual culture, and give it degrees of worth and value to which in their absence it must ever remain a stranger.

The other day I turned over a huge collection of photographic portraits by a large number of photographers, searching for one to which recent circumstances has given new importance, and which I was consequently desirous of engraving for one of our illustrated newspapers, which owe so much to photography. It was drearily-uninteresting work. Now and then a prettier or finer face than usual induced a momentary pause; but, as a rule, there was a wearisomely dead level of sameness. Everything that could make one face look as much as possible like every other face appeared to have been adopted. They might easily enough have all been taken by one man with one set of ideas as to what constituted successful portraiture, in one glass room, with one arrangement of blinds; and the figures were posed in the same spirit of mechanical indolence. There were not, perhaps, more than

half-a-dozen positions in the hundreds of *carte* pictures I inspected. Awkward and graceful, slim and fat, short and tall, delicate and robust, male and female, perfect or deformed, each one was thrust into the same groove with no more regard to fitness, the expression of character, the concealing of ugliness, or giving prominence to beauty or general pictorial effect, than if such things were practically, as we know they are not, utter impossibilities.

Take a fine collection of portrait prints after Vandyke, Titian, Rubens, Sir Joshua Reynolds, Gainsborough, or any other of our great masters in portraiture. The countenances of Vandyke—never losing their wonderful superiority over every other part of the compositions, yet never staringly and harshly prominent—are full of a refined simplicity which does not detract from, but is really part of, their dignity. The pose—unaffected, natural, and easy—expresses character, and is evidently thoughtfully and carefully studied. But the great charm of his fine portraits resides in their general expression. Take, for instance, his heads of Charles I. and compare them with portraits of that monarch by artists of inferior calibre. What an air of mournful grandeur and kingly dignity they have! Resembling the meaner works so far that one can just see they had the same origin, yet there is that in their treatment which removes them into quite another world of art. Largeness is their chief characteristic, lights and shades are massed together, obtrusive details being lost in one or the other, and the general result is one of simplicity and grandeur which strikes even the least appreciative minds. Turning to the works of Rubens you might almost glean from these alone that Vandyke was educated in that great painter's school. The same principles may be recognised, and you perceive similar influences have been at work in producing kindred but higher results. In the works of both these old masters we trace the mind of the painter and the mind of the model; they are emphatically intellectual, as opposed to mechanical, productions.

Burnet says, in one of his *Practical Essays on Art*—"Vandyke made him (Charles) a king overwhelmed with all the troubles of his kingdom, his melancholy adding to his dignity, and he appears as a man full of sorrow and acquainted with grief. This greatness in Vandyke's style of drawing, his firmness and fulness in the light and shade, and simplicity in colour, pervades every part of his canvas. His heads and hands are generally large and well marked, his draperies ample, his attitudes unaffected, and his expressions noble; in short, all the requisites for great historical compositions are to be observed in his works. These qualities he, no doubt, acquired in the school of Rubens; but he possessed others which he must have learned in his observations of nature, and from the portraits of Titian. Rubens' outline is often mannered and tortuous, flowing out of one form into another, with little alteration. Vandyke's, on the contrary, is full of variety, which gives it a greater appearance of truth and individual character. The one is like a sentence without punctuation; the other is marked with points, which gives it force and expression."

The same sound and reliable practical authority, speaking of the general subject, says:—"Everyone who takes the trouble to reflect must perceive that all faces contain two points of view where the character is more or less developed—a profile, and what is termed a 'front' view—and that the seat of a strong likeness is sometimes greater in one than the other. They must also perceive how what is called a 'three-quarter' view of the head gives the artist an opportunity of representing both; independent of which advantage it has a greater variety in the forms, and gives an opportunity for introducing a greater breadth of light and shade, and also of showing the ear, which is often a beautiful feature. There are also a few fixed points which no circumstance can very materially change, viz., the temporal bones which define the forehead, the orbits of the eyes, and the bone of the nose. Having these things in recollection, we perceive Vandyke not only most careful in placing the several features in their places, but most attentive to the line of the profile, both in respect to its outline, the delicacies of its shade, and in giving it its projections and recedings; nor is it ever lost sight of even in a front view. There are other peculiarities in his heads which he carefully attended to, such as the point of the nose, both in the cartilage which divides the nostrils and in the flatness above them; also the markings at the corners of the mouth."

I know that many photographers will be apt to ignore the utility of such subtle studies, and be unable to see how they can be applied to practice, which is conducted under technical circumstances and conditions differing widely from those under the control of the painter. But the artist who uses the camera will not be equally blind. He will know how to modify his treatment to meet such conditions. That while the difficulties are in some instances greatly increased, still they are not unsurmountable, that patient thought and persevering experimentalising have a very fair prospect of being crowned with success; and that feats once as seemingly impossible have of late been successfully accomplished. But, under any circumstance, it is good to know the right thing, because in one way or another such knowledge must be productive of good, sound, practical benefit.

Since writing the foregoing I have made a journey from Nunhead to the Strand, and have been looking at a vast variety of faces. There has been no monotony, no universal absence of interest and character—every single face had its own characteristic expression. The rendless, changeful crowd at the railway station, on board the river steamboat, and in the streets were full of stories which those who run may read. In earnest talk, or chatty gossip, idle lounging, or progressing with restless energy to a day's work of head or hand, every one came and went with individuality definitely and strongly marked. How unlike my progress to town in this respect was my progress through those aforesaid photographs! But here I at present conclude.

A. H. WALL.

FOREIGN NOTES AND NEWS.

PROVINCIAL PHOTOGRAPHERS *versus* THEIR CUSTOMERS.—GELDMACHER'S PHOTOMETER.—A NEW BASE FOR LAKES.—NEW SOURCES OF CAOUTCHOUC.—A METHOD OF REMOVING VARNISH FROM NEGATIVES.—NEW METHOD OF ELECTROTYPING ORGANIC BODIES, ELECTROPLATING OF LEAVES, INSECTS, &c.—A WHITE NON-ACTINIC LIGHT FOR THE DARK ROOM.

IN London and the larger towns we believe it is usual for customers to pay for photographs when ordering them; but in many of the smaller towns, where even for good work the charges are much less than London prices, the system of giving unlimited credit still continues to the great loss of the photographer, who by long delay or non-payment of his account is frequently deprived of his just profit. Repeated sittings, and the consequent waste of the operator's time and chemicals, as well as the increase of the number of specimen copies not charged for, are another great source of loss to the provincial photographer. Some may say—If these grievances press so hardly on our provincial brethren why do they not take the law into their own hands and limit the number of sittings, charge specimen prints as copies, and insist upon prepayment of orders? Some, bold ones, do save themselves from endless annoyance and loss by adopting and adhering firmly to some such rule, but the majority are too timid, and fear to test the truth of the saying—"Nothing venture, nothing gain." One of these faint hearts might argue in this way:—"If I were to insist upon these terms, just though they be, my customers would leave me and go to Mr. Blank over the way; and, half a loaf being better than no bread, I'll e'en work away as I have been doing, for I cannot afford to lose them all. But if I could get Mr. Blank and all the other photographers in the neighbourhood to join me in adopting the new rules it would be for the benefit of us all, and of our customers as well, for we would have more heart to make every print as good as possible if we knew that it would be paid for instead of being but lost time, trouble, and materials!"

The reflections and experience of the members of the youthful Photographic Society at Frankfurt-on-Main must have been something in the style of the foregoing, as at an early meeting it was resolved, for their mutual protection, that the members of the said Society should be bound by the following rules, and that copies of the same should be hung up in their reception-rooms:—

1. A specimen print of a *carte* or cabinet portrait will only be furnished at the express desire of a customer; and then it will be charged for in the account as a copy whether ordered from or not, and whether kept or not.
2. The printing of first proofs cannot be made to depend on the opinion of the sitter. Specimen prints of larger sizes cannot be furnished.
3. When a successful negative has been taken there is no obligation to show it.
4. Customers who are not personally known are requested to pay a proportion of their account on ordering.
5. Orders from a distance can only be attended to when prepaid by post-office order. This rule also applies to specimens.
6. A charge will be made for loss of time when customers make engagements for certain hours and do not keep them.
7. When, in consequence of movement on the part of the sitter, it is necessary to take more than two negatives, a charge will be made for the extra unsuccessful sittings.
8. Reclamations can only be attended to if made within eight days after delivery of the picture.

It would most likely be considered quite beyond the province of photographic societies here if they were to meddle in the matter; but why do not the aggrieved ones form a guild for their own protection in such cases? Surely it is not because they are so jealous of each other that they cannot combine and face the public with the strength of union.

The *Photographische Monatsblätter* gives a description of Herr Geldmacher's photometer—one of the many photometers of which mention has already been made. It is based upon the colouring of chloride of silver paper by exposure to the light. The scale is divided into twenty-five degrees, which are numbered continuously from one to twenty-five. The instrument is of the same form as a thermometer, and consists of a box twenty-five centimetres long, the lid of which is formed by a sheet of glass and the bottom can be opened. Along the glass lid two strips of the scale are pasted, the numbers of which—and this is the distinguishing feature—run in opposite directions. Along the centre, between these, a narrow space is left free in which the sensitive silver paper, which runs upon rollers and may be moved forward at pleasure, is exposed to the light. A small board, placed under the chink, presses the sensitive paper so closely to the glass above, between the two scales, that the light can only reach that part, the interior of the box remaining dark. When in use the sensitive paper is exposed until it becomes exactly the colour of the previously-determined number on the nearest scale. In order to determine and compare this tone more exactly the second scale is used. When it is necessary to print a given tone twice running, all that has to be done is to draw the sensitive paper, by means of the roller, across the slit until an unexposed piece comes under the opening, and expose again.

The scale is prepared in the following way:—A piece of sensitive paper is exposed to the light until it has become a very pale brown; this is used as the standard tone or degree. A strip of sensitive paper the length of the desired scale and twice its width is divided into twenty-five equal parts. These parts are all carefully protected from the light except one division at the end, which is exposed until of the same colour as the standard tint. The second division is then uncovered and exposed along with the first, until the second has also reached the depth of the standard tint, and the first division having been exposed twice as long is twice the depth of the standard. The third division, and so on to the twenty-fifth, are exposed in the same manner until each in turn reaches the standard tint. When the twenty-fifth division has been exposed, being equal to one standard tint, it will be the first or lowest degree on the scale, and the division first exposed having now been exposed twenty-five times, will be twenty-five times the depth of the standard tint or the twenty-fifth degree of the scale. Now fix the paper, number the degrees, and split the strip in two, lengthways, and you will have the two scales running from light to dark required for a Geldmacher photometer.

Böttger publishes the observation that, when an alcoholic solution of any of the aniline colours is mixed with a sufficient quantity of infusorial earth, water added, and the mixture filtered, the liquid will run off clear while the earth retains all the pigment. Infusorial earth is thus proposed as a substitute for alum in the production of the prepared pigments known as "lakes," and as it is very cheap it is likely to be largely adopted.

Le Technologitse says that two new sources of caoutchouc have been discovered in Burmah. The purest caoutchouc is got from the *Chavannesia esculenta*—a climber of the family of *Apocynaceae*—which is largely cultivated for the sake of its fruit. Caoutchouc, but of an inferior quality, is also got abundantly in the same country from another plant called *Anodendron paniculatum.*

For the benefit of those who wish to remove the varnish from negatives the following plan, which has been highly recommended, is offered:—Pour a saturated solution of two parts of alcohol to one part of cyanide of potassium over the plate and keep moving it about until the varnish dissolves, which it will soon do. Wash and dry the plate, then revarnish and treat as a new negative. This method is said to be superior to the alcohol bath, ammonia and alcohol, potash and alcohol, or even alcoholic vapour; but if the negative have been intensified with chloride of mercury the cyanide of potassium must not be used.

It has long been known that by immersing leaves, insects, and other delicate objects in a solution of nitrate of silver, followed by an exposure to the fumes of phosphorus, the silver would be reduced in such a manner as to completely encase the insect or other object in a thin film of the metal. The surface of the insect having been thus rendered a conductor, nothing is more easy than to immerse it in a depositing cell of an electroplating battery, and thus give it a substantial coating of metal. But M. Cazeneuve believes that a method discovered by him for the metallisation of organic substances, so as to fit them for receiving galvanic deposits, is both more rapid and more safe than that just indicated. He dissolves nitrate of silver in wood spirit, and in this solution he immerses the object until it is thoroughly impregnated; after being partially dried the object is treated with ammonia, by which is formed a double salt that is easily reduced. The object, after being dried, is then exposed to the vapour of mercury, by which the surface is completely metallised in a few minutes; it is now ready for being placed in a battery to receive a thick deposit of metal.

Dr. van Monckhoven lights his dark room by means of two sliding panels—one glazed with red and the other with green glass. At a certain distance from the window he finds that the combination of these two colours affords a white light which was entirely without action upon the sensitised carbon paper hung up to dry in the room. Should this mixture of lights be found equally non-actinic with respect to sensitised collodion plates, this discovery will be very important, as it will allow us to follow the different phases of the developing and intensifying processes of the negative much more exactly than is at present possible with the yellow, red, or green light to which our eyes are unaccustomed.

CENTENNIAL EXHIBITION.

No. II.

Besides those in the main building, there are photographs exhibited in Memorial Hall, especially Swedish and Norwegian, and some German (of the Photographic Society in Berlin). All others received their places in the Photographic Hall. Nearly three-fifths of the hall are filled with American photographs; and when we cast a look over the same we notice instantly a great difference between the American and European pictures. Europe has sent, nearly exclusively, plain photographs (negative retouches not excepted), and, indeed, the plain pictures are the main exhibit of the European photographers; while America has exhibited a great number of life-size pictures, executed in crayon, pastel, and oil. We see at once that the position of the American photographer toward the public is an entirely different one from the European. From him the people expect work which in Europe would belong to the artist. In Europe portraits in crayon, pastel, &c., are not known as productions of photographers. Now, many perhaps will make the remark that they indeed do not belong to the line of photography; but certainly it would be wrong if we would exclude these works which are ordered, executed, and delivered in the *atelier* of the photographer. If, in America, crayons, pastels, &c., are executed in the *atelier* of the photographer, we have, of course, to judge them also. The *art* jury has, therefore, to look only at the result; the way and manner of production is a question which, for the *artist*, is to be a secondary consideration. At the Paris exhibition in 1867 they would probably have excluded these photographs, executed by the assistance of a designer, from judgment, as there the jury consisted only of photographers, who wanted the plain photographs to be acknowledged. We notice, therefore, how different the point of view is from which we have to judge the photographer, as it certainly would be for a jury consisting in great part of artists the most competent to judge about pictures in oil, pastel, or crayon.

It must be acknowledged that the Americans show an astonishing skill in the production of these life-size pictures. In Europe we would search in vain for hands to do the same. Such pieces in crayon as exhibited by Kurtz, of New York, must be considered as first-class work; also the charcoal drawings by Sarony. Here a fine understanding of the form of nature is visible, which assists considerably in the change into the stroke manner, so necessary for a crayon. Kurtz made in this respect a further step. He has noticed very well that there exists a difference between the tint of a photograph and the tint of a crayon, which is so much more apparent when the photograph changes after some time. He therefore prefers to transfer, so to say, the whole picture into charcoal, and then to take prints of the same by means of a certain process. In this manner a whole picture in crayon is produced, whose durability is guaranteed—a progress not to be depreciated, though the fact that at last nothing remains of the photograph in the picture is of no consequence. The artist judges only the final result, and does not care about the chemical composition, and just as well, as there is nothing left in the plain photograph of the original negative taken at first.

It is well understood that in these crayons, and also in pastel and oil pictures, the individual differences of the artists are remarkably apparent—as the quiet, precise, artistical harmony of the whole by Kurtz; the effective, thorough work by Sarony; the peculiar inclination to sharp-pointed effects by Ryder (Cleveland); the conscientious work by Bradley and Rulofson, Gutekunst, Notman, and others. The manner of cutting out life-size photographs and pasting them on backgrounds to be worked over by drawing seems to me to be a difficult

matter; roughnesses in the contour are too easily seen. The photographer being no artist, or having no artists at his disposal, must leave this field of work to his better-situated colleagues.

Besides these pictures, which give a peculiar expression to American photography, there are a great number of plain photographs of all sizes, showing that the American photographers are in every respect at the highest position of the art; but what many wished and expected, a characteristic new style, is not to be seen at the Exhibition. As long as such are not existing we still have to use the old styles, and, therefore, the Adam-Salomon and the Rembrandt effects are as yet performing their great part at the Exhibition. Many photographers show a predilection for them—like Anderson, of Richmond; Kent, Rochester; and Kiewning, of Greifswald (Germany).

Yet it is much more astonishing to find that, properly speaking, the father of the Rembrandt effects, Kurtz, has disdained to exhibit them; on the contrary, he has sent a large number of plain photographs, all of which avoid the dazzling contrasts of pitch black and snow white. In their place is to be observed a mild weakening in tints, which, by the public, is considered as less effective, but which certainly will attract the sympathy of the judge of fine arts. As in lights and shades, there are also avoided all extremes in position and illumination.

A quite different character is to be seen in the pictures of Sarony; they abound with what the Frenchman calls "*chic.*" We may shake the head as much as we please about the bold positions and the daring effects of light; they are *chic*ful anyhow, and they show the artist. It is surprising how well he understands how to adjust the too long and unpractical promenade size to his figures; it looks as if the size was cut to the figures. In respect to various positions Sarony produces some astonishing; he is never in want of ideas, and as he likes strong effects of light his pictures give an impression of brilliancy. We only regret that nearly all of his pictures show something of a theatrical air.

Right next to Sarony are the exhibits of Rocher, of Chicago, who this time has sent only plain photographs. He gives the most of his attention to the whole arrangement of the picture, to a stylish decoration, and a *genré*-like conception. Most of his pictures show in their selection of position and their subtle gradations of tint a certain nobleness of appearance, which make them very attractive, as in the group of the *Two Sisters*, *Before the Looking-glass*, the *Fortune Teller*, the *Lady in Rococo Dress*, and the excellent imperial border card.

The exhibits of Gutekunst, of Philadelphia, are grand. Besides large photographs of thorough work there is a long row of pictures of medium size, among them, especially, half-length pictures in cameo style, pressed out oval, and on deep, dark backgrounds, which are finely executed. There are also among his exhibits a large number of landscapes, which seem to be produced by combination printing. We think they are a little too dark, but they show that Gutekunst is an artist in many respects.

Among the portrait photographs there are backgrounds which attract a great share of attention; and hereby it ought to be mentioned that America has an artist who produces very excellent backgrounds, viz., Seavey, of New York. I wish we had some one like him in Europe; but there, unfortunately, we are obliged to paint the necessary backgrounds partly ourselves. In deepness of tint, perspective, and plasticity of effect Seavey's backgrounds are certainly unsurpassed. Just as recognisable are his plastic firesides and similar pieces.

Kent, of Rochester, exhibited several pictures, which appear in half life-size, and, as advertised, are printed from direct negatives. Most of them are of the Rembrandt effect, and have a certain brilliancy. We find the same in Landy's pictures; but it seems to be a very precarious undertaking to try to represent the ages of man, after Shakspeare's known poem. Such a task should have its difficulties even for an artist, and can be considered as unsolvable by photography.

Landy's pictures of children are well known. Besides him, Hesler of Evanston, and Schwind and Krüger of New York, have delivered good pictures of children. The groups of the latter have an effect of uneasiness, on account of placing things that are too light in the foreground. Mosher of Chicago, Broadbent and Phillips of Philadelphia, Bigelow of Detroit, Alman of New York, and Bradley and Rulofson of San Francisco have delivered work in plain portraits which is worthy of acknowledgment.

Especially ought to be mentioned the enlargements of Paxon, of New York. He delivers them plain, and seems, to judge by the exhibited specimens, to receive numerous orders from foreign photographers. If we count, besides those we have mentioned, Brady of New York, Gubelman of New Jersey, Wenderoth of Philadelphia, Cox of Baltimore, Hardy of Boston, Taylor of Philadelphia, Rice of Washington, Pach of New Jersey, and Freeman of Texas, then, we think, there can be no complaint about neglecting the branch of portraits in the American department.

The landscape compartment embraces a smaller domain, though among them are most respectable pieces. In the first line stands Watkins, of San Francisco, with his Californian views. Next, following him, are Houseworth and Bradley and Rulofson, of San Francisco; they have delivered especially large prints. After them are many photographers who have taken landscapes in connection with architecture, namely, Sweeny of Cleveland, and Reid, Paterson, and Doremus of the same place. The latter, to judge by the picture, had a floating *atelier* on the Mississippi, and went with it from place to place, or followed some such original wandering existence.

Pach, of New York, is employed in taking pictures of horses, besides landscape scenes and also outdoor groups, in which he is not without success.

Black, of Boston, has sent a row of his well-known Arctic pictures. In strong contrast to them are those of Marshall. There icebergs, here hot springs—the renowned geysers of the Yellowstone, in Colorado.

More yet is represented in the branch of stereoscopics, of which Bierstadt, of Niagara, has the greatest exhibition; he has six hundred pieces exhibited, among which are stereos. from all parts of the world.

Further are to be mentioned Stoddard of Glen's Falls, Reilly of Yosemite Valley, and Cremer, with views of Philadelphia and fine graphoscopes. Thorne of New York, and Butterfield of Boston have also delivered several prints with success. Alman, of New York, is distinguishing himself by clouds in the English style.

—*Phil. Phot.* H. Vogel, Ph.D.

Our Editorial Table.

Enamelling and Retouching in Photography. By P. Piquepé.
London: Piper and Carter.

About four weeks since we were waited upon by a person who described himself as a Berlin artist, and who, for "a consideration," offered to impart to us the whole "mystery" of enamelling photographic prints. As the specimens which he exhibited were decidedly inferior to those we were in the habit of doing ourselves by the methods described in recent issues of our Almanac we declined the offer. Information, too, had reached us that similar itinerant vendors of processes were trading upon the presumed ignorance of photographers, and were selling formulæ for this alleged "mystery" copied from our Almanac of 1873. The publication of our article in last week's number will, we trust, put a check upon such practices.

A teacher of a very different stamp is the author of the work indicated at the head of this article. It may be remembered that in our number for July 7th (seven weeks ago) we spoke of certain specimens of enamelling received from M. Piquepé as being very rich, the surface exceedingly fine, and having as strongly marked a resemblance to a vitrifiable enamel as it would appear possible to secure with a paper picture. M. Piquepé, the producer of those gems, has, in the manual now under notice, published, for the benefit of his *confrères*, the full details of the method he employs. While the process of M. Piquepé is in its main features similar to that which we published last week, there are certain variations upon that method, and also numerous elaborations in details, which render his instructions most valuable, especially as these are given with great attention to the minutiæ of the process. For this reason we are much pleased with the publication of M. Piquepé's manual; for, while we are assured that he can produce charming pictures with enamelled surfaces, we also perceive that he describes with considerable carefulness the method by which he produces his effects.

M. Piquepé's work, besides treating on the subject of "enamelling," also contains several chapters on "retouching." In his prefatory notes the author speaks of both the use and the abuse of retouching. As illustrative of the latter, he says that in many studios the operator trusts entirely to the skill of the retoucher. He troubles himself very slightly with the manipulations. He cares little whether his sitter is well or badly lighted; whether his negatives are free from spots or stains. If the negative be sharp and not too hard the retouching, he thinks, will do all the rest. In affirming this to be quite wrong M. Piquepé holds the opinion that we and every sensible writer also entertain, namely, that it is a fatal mistake. We find in the work before us that the whole subject has been carefully gone through, and that full information is given with regard to the preparation of the surface of the negati ve for the purposes of retouching, to which valuable information are added formulæ for the preparation of the various kinds of varnish recommended, and, of course, practical instruction in the use of the retouching pencil as applied to portraits or landscapes. In connection with working on enlargements M. Piquepé speaks of the value of backing the negative with tracing paper, or *papier vegetal*, and working upon this surface with the stump and blacklead powder in those cases where, owing to the broad lights being defective, these require to be produced. Of such class are draperies.

We welcome M. Piquepé's treatise on *Enamelling and Retouching* as a work that will prove very useful.

Meetings of Societies.

BERLIN PHOTOGRAPHIC SOCIETY.

At a recent meeting of this Society the chair was taken by Herr Prümm, owing to the absence of Dr. Vogel at Philadelphia.

In the course of the evening a number of subjects were discussed, and various articles were handed round for inspection, but there was no *pièce de résistance.*

A letter from Herr Tiator, of Colmar, bearing upon his preparation for spotting pictures, similar to that sent to the Vienna Photographic Society, was read, and the accompanying *cartes* were taken home by Herren Prümm and Schaarwächter, to be examined more closely.

Herr Schmidt, of Kiel, sent for inspection a carbon print with a peculiar flaw in it, as he wished to know the cause. On becoming loosened from the opal glass it was seen that part of the surface of the picture remained dull, the curious matter being that the dull places corresponded with the half-tones, the high lights and the deepest shadows being perfectly glazed. Herr Schmidt was inclined to attribute it to the] wax solution. Formerly he used a solution bought from Herr Talbot; but since he had been using a solution of home manufacture he had found dull spots pretty equally distributed over the surface, and which were formed almost exactly above the middle tones.

The Chairman advised Herr Schmidt not to pour on the wax solution, but to rub the glass plate with it.

Herr Schaarwächter found it practicable to use no wax at all, but to rub the plate with talc instead, as advised by Dr. Weissenborn.

Herr Quidde thought, from Herr Schmidt's account of the matter, that the fault must rest with the quality of the wax solution.

Five cabinet pictures printed in carbon by the Autotype Company, from negatives by Herren Prümm and Schaarwächter, were next handed round and admired.

A discussion arose about the merits of Herr Kullrich's new album, a specimen of which was shown by Herr Schaarwächter.

Herr Schaarwächter at the same time remarked that it offered the advantage of allowing the pictures to be easily put in and taken out again. The lower edge of the mount remaining visible leaves room for an inscription, &c. Herr Schaarwächter further pointed out that the beauty of the whole would be greatly enhanced if all the mounts were of the same colour—say a pale buff.

Herr Linde agreed with the former speaker in thinking it very desirable that an uniform colour should be adopted for mounts all over Germany, as had already been done in France and England. The variety of colours was very annoying to the dealer. As to the album they were examining he supposed it might be useful as a specimen book to dealers, but he did not think it would "take" with the general public.

Herr Lindner's objection to the album was that the arrangement would facilitate the already too frequent misappropriation of the pictures.

Herr Schaarwächter prevented that by using a box which holds three hundred pictures, and which is constructed like a revolving stereoscope, so that the pictures came up one after the other, but were protected by a sheet of glass.

Herr Quidde thought the construction of the album practicable but ugly. The picture with three sides framed and the fourth free had an unfinished look.

Two cabinet pictures by Sarony, of New York, were then laid on the table. Each was the portrait of a lady, and on the background near her was a very strongly-marked black cast shadow, giving the impression of the picture having been taken in the sun. In reality, however, the shadows were strongly painted or drawn with charcoal upon the background, and photographed along with the sitter.

The Chairman spoke very highly of Sarony's pictures in general, and advised that some of them should be added to the Wander album just now, when numbers of them were to be seen in the show-cases.

Herr Fechner hoped that they would not choose the specimens now lying before them for that purpose, as they were by no means extraordinarily beautiful, and the drawing of the shadows was perfectly false and unnatural.

A number of lichtdrucks by Herren Brauneck and Maier, of Mainz, and Herren Aubel and Kaiser, of Cologne, were then laid on the table.

Dr. Weissenborn showed a piece of fluted plate glass, and asked whether it was suitable for the roof of a glass house.

The Chairman said it was very well suited for that purpose; at Gebruder Siebe's, in Breslau, it had been tried and stood the test exceedingly well. It diffused the light without weakening it perceptibly, and the glass house was consequently well lighted.

The proceedings were brought to a close by a long discussion on a section of the new copyright act, which requires the name and address of the copyholder and the year of taking to be printed on every protected photograph, and not on the mount as formerly.

Correspondence.

GELATINO-EMULSION EXPERIENCE.

To the Editors.

Gentlemen,—I have succeeded so well with the gelatine emulsion that I am not likely to return to tents. I enclose you a photograph of a lion, in the Clifton "Zoo," with a plate according to King's formula. I have a few stereos. (instantaneous) by the same process, specimens of which I will send you shortly.

I find plates prepared with bromide of ammonium, to which silver has been added after dialysing, give very fine results, but will not keep, I think.—I am, yours, &c., J. D. Lysaght.

Westfield House, Redland, Bristol, August 29, 1876.

[The "subject" will approve itself to every reader as one the photographing of which is attended with some difficulty, and the print enclosed by Lieutenant Lysaght proves that, thanks to the process to which he refers, the photographing of animals is now relieved of much of its difficulty. It also proves the extreme sensitiveness of gelatine plates.—Eds.]

IMPERFECT HALF-TONES IN DRY PLATES.

To the Editors.

Gentlemen,—The letter of "W. H. F." in your issue of last week opens new ground in connection with emulsion work.

I have worked extensively with collodion emulsions, but, so far as I recollect, I never but once prepared any plates that were deficient in the property of rendering half-tones. On that occasion I was using a pyroxyline that even when used in the preparation of wet collodion gave prints possessing that quality—a quality, however, that I valued very highly at the time; for in the production of negatives of engravings half-tones were not required, intensity and hardness being the *desiderata.* To the peculiar character of the cotton, then, I am inclined to attribute the hardness of "W. H. F.'s" negatives.

There has recently been such an outcry made on account of the thinness of negatives obtained by the washed emulsion process introduced by Mr. W. B. Bolton that, rather than have recourse to the addition of gallic acid as suggested by Captain Fox, I can readily enough understand how that a strong pressure may have been put upon the manufacturers of pyroxyline to supply an article possessing much more than the usual intensity; and that in the diminished half-tone complained of is to be seen one of the results of their doing so. I think, however, that if "W. H. F." will favour us with a *detailed* account of his method of preparing his emulsions it will prove of interest to numerous dry-plate workers, as serving to indicate possible conditions under which shortcomings in the use of this most beautiful process may arise.—I am, yours, &c., Zero.

August 29, 1876.

PICTORIAL DESIGNS IN PHOTOGRAPHY: THE "ACADEMY" PORTRAIT.

To the Editors.

Gentlemen,—From the remarks of Mr. Ferranti in your last number your readers might be led to think that Mr. Brookes had been guilty of cribbing what really belongs to Mr. Higginson. Anyone who has seen the portrait alluded to by Mr. Ferranti and the new designs by Mr. Warwick Brookes will not fail to be struck with the different results.

Mr. Brookes, in an artistic manner and with great conception and judgment, has really produced something which is worthy of him. It is no new idea to take a photograph and surround it in a frame. Such has been done years ago, and possibly Mr. Higginson may have seen such. "Render unto Cæsar," &c. (whilst I write I have before me an engraved portrait of George Stephenson, the engineer, surrounded by his numerous tools, &c.); but to use these surroundings artistically and with good taste, so that they shall really add to the portrait, is the one great feature in Mr. Brookes's design.

I am not going to say one word against Mr. Higginson, as I believe him to be an ingenious and clever worker, and one that has rendered good service to carbon printing; and I cannot for one moment think that, personally, he has made any complaint against Mr. Brookes. (Mr. Higginson is just as much at liberty now to go on and use what he has worked out as he was before. Mr. Brookes simply claims his own designs.)

I think, for the good of our profession, we ought to be a little more charitably inclined one towards another, and hail with gladness, from wherever it comes, anything that will tend to increased trade, and elevate our profession in the eyes of the public.—I am, yours, &c.,

August 30, 1876. B. T.

EXCHANGE COLUMN.

No charge is made for inserting these announcements; but in no case do we insert any article merely *offered for sale*, that being done at the small cost of one shilling in our advertising pages. This portion of our columns is devoted to exchanges only. It is imperative that the name of the person proposing the exchange be given (although not necessarily for publication, if a *nom de plume* be thought desirable), otherwise the notice will not appear.

Wanted, a microscope in exchange for sciopticon (never used).—Address, BOOTH, Alexandra House, Roe-lane, Southport.

For exchange, Tissandier's *Handbook of Photograghy* and Hardwich's *Chemistry* in good condition. Offers requested.—Address, A. HOLLIS, Huntingdon.

An electrical apparatus, in good order, worth £3, in mahogany cabinet with book of instructions, will be given for a good head-rest or rolling-press of equal value; difference will be paid in cash.—Address, J. BULMER, Brora Post-office, Sutherland, N.B.

Rouch's whole-plate dark tent, complete, with stand, cistern, sink, &c., but little used, cost £6 10s., will be exchanged for a hot-plate rolling-press for whole-plate pictures, or for a binocular camera by a good maker.—Address, J. D. L., Athenæum, Bristol.

Wanted to exchange, either a rapid portrait lens, by a London maker (focus six inches), or a 10 × 8 leather bellows camera, swing back, &c., nearly new, for a rapid half-plate symmetrical by any good maker; difference adjusted.—Address, MAURICE O'CONNOR, Caherdaniel, Caherciveen, Kerry.

ANSWERS TO CORRESPONDENTS.

PHOTOGRAPHS REGISTERED—

F. W. Livsey, Summerseat, Manchester.—*View of Waterfall near Stubbins.*

John White, Salford.—*Portrait of the Lord Bishop of Manchester, and three Groups of the Lord Bishop of Manchester and Rural Deans of the Diocese.*

☞ *Correspondents should never write on both sides of the paper.*

CAPT. GUBBINS (Ercand).—Received. In our next.

VIGNETTE MASKS.—We have received from Mr. Waymouth two new sizes of these useful vignetting masks. These are suitable for landscapes or portraits 12 × 10 and 10 × 8.

J. C.—If you desire to send the articles mentioned abroad—say to India—it will be much better to do so through a London wholesale and export chemist; for it is probable that if the contents were declared in the manner indicated by you the package would be refused admission on board the steamer.

DER KOHLE-DRUCK.—We have received from Dr. Paul E. Liesegang a manual of the carbon process printed in the German language. It embraces everything referring to this process that is requisite to enable a photographer to engage in its practice, and it contains several illustrations of the apparatus required.

CADMUS.—We cannot advise you to change your old and tried lens for one of the others you mention, unless you first have an opportunity afforded of working both kinds side by side. If a "rapid" lens be worked with a stop of the same dimensions as you now employ—and we believe this will have to be done—then the exposure required will be similar in both cases.

A PRINTER.—With respect to the blistering of your prints, we recommend a careful study of two articles which have appeared in this Journal during the past month, written by Mr. J. Skinner—a gentleman who, from his long experience as the head of the Albion Albumenising Company, has had exceptional opportunities for studying the textures of the various kinds of paper.

C. MAGRAW (Dublin).—We believe that the coating of a curved plate with gelatine will not prove such a difficult feat as you imagine. If the plate be of large dimensions let it be suspended by the corners in the manner adopted with albumen plates in ante-collodion times, and by giving it a gentle rotation after coating it there will be no danger of too large a quantity settling at the centre.

G.—This correspondent, *apropos* of our article on *The Practical Application of Alkaline Development* in last week's number, endorses what we have said concerning the advantages of varying the proportions of the constituents of the developer to suit a certain class of subjects. In his own practice he always begins with weak pyrogallic acid, strengthening with more as intensity is required.

M. O'C.—If you can get a lens having an aperture half of its focal length you may depend upon its working so rapidly as to enable you to have instantaneous "shots" at a variety of objects. The lens specially mentioned in your letter is of foreign manufacture, but it is well finished; and, if we are to judge of the whole from one of them which was submitted to us for examination a few years ago, we should say that you can use it with advantage.

T. BROWN.—To ventilate your dark room remove two bricks at a height of eight feet from the floor immediately above the small window nearest the door, and having made an aperture of sufficient dimensions place over it a trap formed of two pieces of wood and constructed in such a manner as not to allow light to gain admission. Next place an air-brick close to the floor, and we believe for the future you will not have cause to complain of imperfect ventilation.

W. J. BAKER (Buffalo).—Although at present we cannot speak definitely, we can still hold out strong hopes of the volume being obtained and forwarded without loss of time.

W. E. W.—1. We, too, have been much troubled of late with surface markings, which we found to be caused by the hard and non-porous nature of the collodion. By way of experiment we added to three ounces of this horny collodion an ounce of an old and very rotten sample which was worthless when used by itself, and from the resulting mixture we obtained clean negatives of excellent quality, there being no trace of oyster-shell markings on them; but we also got freedom from those markings when using the remainder of the collodion, or that to which none of the old sample had been added. We took care to drain the plate well after removal from the silver bath, and to pad the corners of the plate with blotting-paper in such a way as to absorb all the solution of nitrate of silver that trickled down, for to that silver was due, in this case, the formation of markings. We also tried, with success, the transference of the plate to a bath containing a ten-grain solution of silver, allowing it to remain there till "greasiness" disappeared. Collodion which gives markings of this kind, as a rule, adheres very badly to the plate; but a simple edging of the plate with diluted albumen secures its adhesion.—2. Mr. Ackland's method of preparing albumen is to mix twenty-four minims of glacial acetic acid with an ounce of water, and add this to eight ounces of albumen. It is stirred with a glass rod for a minute, then allowed to rest for an hour, after which it is strained through coarse muslin, half-a-drachm of strong ammonia being then added to the albumen, which is preserved in closely-corked bottles.

WARNING TO PHOTOGRAPHERS.—Our attention has been called to the necessity of warning photographers against a person who is in the habit of calling at metropolitan studios under pretence of purchasing silver residues, &c., failing, however, to remit the promised amounts. There is reason to believe that he has been engaged in these nefarious practices before, and that similar warnings have appeared in the photographic journals some time ago in relation to him. He is said to pass under two or three aliases. He is described as about forty years of age, manifestly not an Englishman, and of untrustworthy aspect. Photographers will do well to be cautious in dealing with any such visitor whose credentials are of a doubtful character.

FINE ART IN BETHNAL GREEN.—The famous collection of pictures so well known as the "Dulwich Gallery" which has been lent by the governors while the gallery is under repair to the Bethnal Green Museum, will be open to the public on Monday next, the 4th September. The collection consists of nearly 300 oil paintings of the Flemish, French, Italian, Spanish, and English schools. It comprises works (amongst other great masters) by Rubens, Rembrandt, Ruysdael, Hobbema, Vandyck, A. Ostade, Teniers, Wouvermans, Both, and Cuyp; the Poussins, Claude, and Walteau; A. del Sarto, Guercino, Guido, Annibale, Carracci, S. Rosa, P. Veronese, and Titian; Murillo and Velasquez; Reynolds, Gainsborough, Beechey, Wilson, &c.

HOW YOUNG PHOTOGRAPHERS MAY SUCCEED.—Do good work. If you are not by nature a superior photograph operator employ some one that is. Keep the other threads of your business well in hand, from the finances to the minutest details of the work. Treat your customers well. Do all you can to serve them in a polite and obliging way without servility. Insist, without many words, on keeping your place as head of your business, and expect patrons to submit to the reasonable regulations of your studio. Learn from all sources the best methods of doing business or work. Increase your prices as fast as you improve your work and style of carrying on business. You can do it in the face of any amount of competition. This method has brought one photographist to a successful business, and it will others, if they perseveringly follow it.—A. N. HARDY, in *Phil. Phot.*

METEOROLOGICAL REPORT,

For the Week ending August 30, 1876.

Observations taken at 406, Strand, by J. H. STEWARD, Optician.

THESE OBSERVATIONS ARE TAKEN AT 8 A.M.

August.	Bar.	Wind.	Wet Bulb.	Dry Bulb.	Max. Tem.	Min. Tem.	Remarks
24	29·87	N	54	59	68	52	Hazy
25	29·99	NE	48	54	63	47	Dull
26	30·04	NW	51	55	68	47	Raining
28	30·03	W	54	58	67	51	Dull
29	29·68	W	59	63	70	57	Cloudy
30	29·78	W	55	60	70	52	Dull

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THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 853. Vol. XXIII.—SEPTEMBER 8, 1876.

TRANSPARENT SPOTS IN NEGATIVES.—IN SEARCH OF A NUCLEUS.

We have been much more amused than edified by the various expressions of opinion elicited from visitors to our editorial sanctum, on being shown certain negatives possessing circular transparent spots which we have on "exhibition." These negatives, we may premise, have been obtained by that all-important process now so well known as the "washed emulsion." One of these opinions is in substance that they are the result of specks floating about in the collodion, to effect the removal of which, by filtration, is to secure the elimination of the transparent spots. But when the reply to this is that so perfect and thorough has been the filtration that only a few ounces per day have been able to pass through the pores of the filtering medium, then further guessing is done away with and ignorance stands confessed.

What is the real origin of transparent markings? We are almost ashamed to state that we have spent many hours in endeavouring to elucidate this mystery, and at present our knowledge of the cause is so deficient that we would rather have avoided writing upon the subject at present, were we not assured that the smallest contribution we can make towards this desiderated discovery would be most acceptable, if only by way of opening up the matter for discussion.

Transparent spots in emulsion negatives must not be confounded with pinholes in wet collodion pictures—certainly as regards their appearance. Whether they be proved to have a common origin or not, it must be admitted that the visual development of the evil is not alike in both cases. In the latter a sharp, well-defined, transparent spot of minute dimensions attests the undeniable and undesirable presence of the pinhole spot; in the former the plague spot embraces a much more extended area, and, so far from being comparable with a pin-point, its dimensions range from that of a large pin head to that of a small split pea, although the first dimension is that most frequently to be met with.

There are several causes for specks, and even large transparent holes, in emulsion negatives; but in this article we entirely ignore those which are caused by solid particles of foreign bodies which, in the form of dust or otherwise, may have found their way into the collodion. In conducting numerous experiments, with a view to discover the nature of these transparent aureoles, we have gone the length of dusting upon the surface of the prepared plate, not only lime, but such crystalline bodies as result from the combustion of gas. In every case, however, we found that the aureole proper had an origin quite distinct from those sources. We shall endeavour to describe the appearance of one of these "plague spots," and the circumstances under which it makes its appearance.

When the alkaline developer is applied, the pin-head spot is seen with increasing visibility in proportion as the surrounding area of the negative becomes darkened by the reduction of the bromide from the film. The spot is now, by contrast, transparent, or, at any rate, translucent. A continuation of the development, or a forcing or intensifying of the image, by either the alkaline pyro. or acid silver solutions, only intensifies more and more the transparent character of the spot. One conclusion is inevitable, namely, that, owing to some cause or other, the very limited area forming the spot is devoid of sensitiveness to light; otherwise, why should not the atoms of bromide of silver embraced in it not become reduced like those by which they are surrounded? If, now, the negative be treated with hyposulphite of soda the spot formerly translucent becomes quite transparent, proving that it is composed of a congeries of atoms of silver bromide, which are dissolved by the hyposulphite, leaving bare glass in their stead. This is further proved by applying nitric acid, instead of hyposulphite of soda, to the negative; for by this act the negative is converted into a transparency, owing to the solvent action of the acid upon the silver which formed the image, and which leaves, as the result, a *transparency* in which the most opaque portions are those on which the light, during the exposure in the camera, acted most feebly. In this transparency the whilom translucent spots are now the most opaque parts in the picture. All this only proves the composition of these spots.

Microscopic examination at the various stages confirms the foregoing, as the atoms of bromide and those of metallic silver can be readily distinguished under a power of medium strength. But such examination also reveals the fact that in the centre of each aureole is an exceedingly minute speck, which, at first sight, would appear to have formed a nucleus. When one, however, compares the very small nucleus with the large surrounding area, the wonder arises how anything occupying such a space—compared with which a pin point is Brobdignagian—could possibly exert so malign an influence over an extended area.

For a considerable time we were of opinion that this nucleus would turn out to be composed of one of the now recognised double haloid silver salts; and, on the assumption that it was formed by a minute crystal of the bromo-nitrate of silver, we examined it accordingly. Here we may observe that the present state of our knowledge of the precise circumstances under which this compound salt is found is far from being complete. The probability is that, as soon as the soluble bromide has been converted into bromide of silver by the nitrate of this metal with which it is brought into contact, the formation of bromo-nitrate commences. It is the custom at present—at least, with several experimentalists—to form the bromide of silver in presence of an excess of the nitrate, and this course, we know, is conducive to the formation of the double salt. Well, granting that the bromo-nitrate has been formed, and has found a resting-place in the film spread out upon the glass plate, how, it may be inquired, will a crystalline atom of this kind affect the surrounding space? This is not very difficult to answer, if we only were assured of the nature of the nucleus. Bromo-nitrate of silver is decomposed by water, and when the film has been made wet, previous to having the developer applied, the bromide of silver into which the crystalline speck is decomposed may be attended by the liberation of either hydrobromic acid, bromine, or soluble bromide, which, permeating the film in the parts immediately surrounding, instantly nullifies the change induced by the action of light in the camera, and thus converts that area into a patch upon which the developer could not exercise any reducing action. Old daguerreotype artists were well aware how that by exposure of a daguerreotype to the fumes of chlorine, iodine, or bromine, if only for an

instant, the latent image was completely removed, and the mercurial fumes by which development was effected failed to produce any result.

We return, however, to the physical appearance of the nucleus as displayed in the microscope. So very minute is it that when the aureole is viewed by reflected light, under such a power that it quite fills the field of the microscope, and the nucleus is in the centre of the field, it will be a considerable time before one unacquainted with its characteristic appearance can even discover the atom which exerts such a widespread agency. One gentleman to whom we showed it under circumstances similar to those described compared it, in its relation to the transparent spot, to a fourpenny piece lying in the midst of a five-acre field. Upon increasing the magnifying power it is seen to be a little hill which casts a distinct shadow.

Examination by polarised light quite fails to show the presence of anything akin to a crystalline body. The appearance of the nucleus was carefully watched while it was being treated with a saturated solution of hyposulphite of soda, but no change was apparent by which any new light could be thrown upon its nature. Nitric acid was tried with similar results. At last we determined to apply pressure to the top of the little mountain which so persistently baffled research, and after much trouble we eventually succeeded in crushing several fine examples of these nucleii by means of a finely-pointed ivory spatula of needle-like dimensions. This demonstrated the fact that the little hill was merely a shell, nothing of an opaque or crystalline nature being present.

The inquiry now presents itself—What is the nature of the formation in virtue of which the collodion film was raised from the glass like a pustule, containing, at one time, a virus capable of penetrating into remote parts? The bromo-nitrate hypothesis would quite well apply to the appearance presented but for the following consideration:—Some of the transparent spots are not circular, but rather of a comet-like form, the tail, so far as we can discover, following the direction in which the collodion was poured off the plate. This leads us to deduce that the destructive emanations from the nucleus must have been in full force and activity previous to the setting of the collodion, and, consequently, prior to the application of the water by which the decomposition of the bromo-nitrate of silver would be effected, assuming the nucleus to consist of that compound salt. We are almost forced to assume that the nucleus, whatever its composition may be, had a greater affinity for the surface of the glass plate than the collodion by which it was surrounded, or into which it was embedded, and that it rested upon the surface of the plate while yet the collodion was still flowing in a sluggish manner, just before its onward course was arrested by the evaporation of the ether, and that a baneful influence was exercised upon all the collodion which flowed over or past the nucleus, the "influence" asserting its presence as a desensitiser. So far as we can see the bromo-nitrate of silver does not act in this manner.

A question here arises as to whether the disturbing element may not prove to be an infinitesimal globule of some fluid which is present in, but does not quite mix with, the ether or alcohol which form the solvents of the collodion. Our investigations have not yet extended quite so far as this, but from one or two circumstances this hypothesis is not undeserving of attention. Some have found that when after a brief delay in working they resumed the preparation of emulsion all their previous trouble had quite disappeared. It may be remembered that a very successful amateur, Mr. John Nesbitt, has described in our ALMANAC for the present year how in his earlier experiments with the washed emulsion process of Mr. W. B. Bolton he found certain circular spots with which he had not been subsequently troubled; and, in attributing their disappearance to the observance of certain details, which some might deem trivial although he considered them important, Mr. Nesbitt has given information which bears strongly on the possibility of the circular markings having been caused by bromo-nitrate—a salt which, it will be remembered, we have stated was usually found when the silver was in excess. On this topic Mr. Nesbitt says:—

"In my first experiments the silver was introduced before pouring in the bromide; but I found the former thrown down in small crystals in the collodion, and feared the silver would not completely combine in that form on the addition of the bromide. I therefore prefer to add the bromising solution first."

If, as implied by Mr. Nesbitt, the presence of the round spots in his case depended upon his adopting a certain order in adding to the collodion the nitrate of silver and the soluble bromides, the knowledge of this fact will be of great assistance to those who are engaged in trying to discover the true cause of the existence of the blemishes which have formed the theme of the present article.

We purpose resuming this subject as soon as we have proceeded with further investigations now pending.

THICK *VERSUS* THIN FILMS.

THE question has frequently been raised as to the effect produced by thick and thin films respectively upon the rapidity of working and the quality of the negatives resulting therefrom. There can be no doubt that the behaviour of two films of different thickness (one of which contains say twice the quantity of sensitive material as compared with the other) must vary considerably; but it is not equally clear that either one or the other is capable of producing a superior result, though they may probably require different treatment. In fact, however, claims have been made in favour of each class of film that the quality of the resulting image is superior in point of half-tone and gradation, and also that the sensitiveness is materially affected in various ways by the density of the layer of silver employed in the formation of the image; and as extremely divergent opinions have been expressed we have endeavoured to arrive at a practical solution of the question.

First, as regards the quality of the image: it seems only natural to suppose that the greater the thickness of the layer of matter composing it the greater the range of half-tone obtainable; but before accepting this as a fact we should consider the circumstances under which the image is formed. We have had frequent occasion to call attention to the different principles involved in the two forms of development in use at the present day, and need only remind our readers that, while silver development produces an image by the deposition of fresh silver upon the surface of the film, the picture formed by alkaline pyro. is obtained at the expense of the silver contained in the film itself, the result being in the one case a "building-up" with new material, and in the other a molecular re-arrangement of the material already present. Here, then, we have a very palpable explanation of the different opinions expressed upon this point.

As we have remarked in the case of alkaline development, the image is formed out of the material of which the sensitive layer is composed; it is evident, therefore, that a certain thickness of that layer is requisite in order to afford sufficient density in the highest lights. It is also plain that in the altered circumstances of silver development the actual thickness or density of the film is a matter of much less importance; for the quality of the image depends not upon the quantity of silver haloid forming the sensitive layer, but upon its capability of duly recording the action of light. It does not follow, however, that an extremely thin film *must* give a satisfactory or even a dense picture under the prolonged action of silver development, because much of the quality of the deposit depends upon circumstances altogether independent of the density of the film, in this as well as the other form of development; still, between the two methods there is a sufficient difference in principle to account for a great deal of the discrepancy in the opinions expressed with regard to the best description of film.

Turning to the question of sensitiveness, we cannot make the same distinction between the two modes of development. Sensitiveness is, strictly speaking, entirely independent of the form of development employed; for, though it is quite possible by using one method of development to secure a result with a given exposure, while twice or thrice the time is necessary if another developer be used, it must be remembered that the effect of light is secured before the development is commenced, and that the latter, according to the form employed, is only a proportionately powerful means of turning

the light's action to the best advantage. In illustration of what we wish to convey we may instance the use of iron and pyrogallic acid respectively upon an ordinary wet plate; the latter is capable, with iron development, of producing a picture with a given exposure, but if pyrogallic be substituted for the iron the exposure necessary to give the same result will be much longer, yet it is evident the sensitiveness of the plate itself is unchanged. Development, then, must be left out of consideration altogether, and we must trust entirely to the physical properties of the films themselves for any advantage as regards rapidity.

Several writers--amongst them the late Mr. Sutton—have stated that density of film is essential to sensitiveness, or, at least, that that quality is thereby increased; but we are by no means certain that the arguments brought forward in support of that view are tenable. It may happen, and probably is the case generally, that a thick film will, *cæteris paribus*, give a more vigorous result than a thin one, but that is scarcely a difference in sensitiveness; yet most of the arguments we have seen have been based upon the principle. We have previously had occasion to remark upon the distinction between density and sensitiveness, and the proneness of many to mistake one for the other, and anything further we could say upon that subject would be but a repetition of what has been said before. It appears to us that a collodion iodised to a certain point, or an emulsion containing a given quantity of bromide per ounce, can give no greater rapidity than if diluted to half the strength, though, undoubtedly, a more vigorous picture would ensue in the first instance, which by many would be mistaken for greater sensitiveness.

Thin films also have their advocates, and we must confess that our favour lies in that direction. The plates prepared by Dr. Hill Norris, which a few years ago were the most rapid dry plates obtainable, were remarkable for this quality, and we have ourselves more recently both seen and prepared bromide plates of unquestionable rapidity, yet of such thinness as to appear to one unacquainted with their properties incapable of giving a picture of printing density.

In speaking of the thickness of films a distinction must be made between density and opacity. A film containing a comparatively small proportion of silver haloids may be actually denser as regards the transmission of light than one containing a much larger quantity, while a film rich in sensitive material may transmit a much larger quantity of light than a poorer one. This is not an unimportant item in the consideration of the question, for a good deal depends upon the transmission of the light.

Mr. Sutton upon one occasion expressed his opinion to the effect that, if it were possible to obtain a film of silver bromide half-an-inch in thickness, an image impressed upon it would, upon development, be produced through its full depth. This we are now in a position to question; for, having poured out an emulsion to the depth of only an eighth of an inch, we were unable, even with a very long exposure, to reduce the silver beyond a small fraction of its thickness, and that only at the expense of surface fog. The fact appears to be that the developing action extends only so far as the light is able to penetrate into the film; and this may be noticed even with an ordinarily dense plate if a rather short exposure be given, as is proved by its appearance when viewed from the reverse side, or by dissolving the developed image with nitric acid, when a certain thickness of unreduced bromide will remain.

The primary results of our experiments have been in favour of dense films—first, with alkaline development, second, with silver development without re-intensification; and in favour of thin films with either forms of development if silver intensification be employed, in the latter cases the results having proved more satisfactory as regards the quality of the image. We shall give an account of further experiments in another article.

AMMONIA.

In our number for August 18th we published the results of some experiments with various alkaline salts in the development of the image on bromide of silver films—results which seemed to show that the carbonate of ammonia possessed certain advantages over all the others. We have recently had an opportunity of witnessing on a large scale the manufacture of several preparations of ammonia, and are induced to return to the subject under the impression that every little information concerning a substance now so generally used by our readers will prove of interest to them.

Although ammonia in one or other of its various forms or combinations is a body of very great importance, and one that is very largely used in the arts—and although it has been the subject of much patient investigation—the question, "What is ammonia?" has not yet been quite clearly answered. It is, no doubt, true that if ammonia pure and simple, in the only form in which we know it—ammoniacal gas—be placed in a tube over mercury, and have passed through it an electric spark, it will be resolved into three atoms of hydrogen and one atom of nitrogen (NH_3), and that in relation to certain acid radicals it performs exactly the same part as do the metals sodium and potassium. For example: nitric acid, HNO , has its hydrogen displaced by an atom of potassium or sodium, and becomes potassium or sodium nitrate—KNO_3 or $Na\ NO_3$ respectively. In the same way sulphuric acid, $H_2\ SO$, by the displacement of its hydrogen, becomes $K_2\ SO_4$ or $Na_2\ SO_4$. Now an examination of the nitrate or the sulphate of ammonia shows that the hydrogen of the acids has been displaced in exactly the same way, forming $NH_4\ NO_3$ and $NH_4\ SO_4$ respectively, or ammonia nitrate and ammonia sulphate. NH_4 is, therefore, regarded as a hypothetical metal, and, according to Roscoe, has been isolated in the form of a dark blue liquid possessing a metallic lusture, which can only exist under high pressure and at a low temperature, and very readily decomposes into ammonia and hydrogen.

Although the simple bodies are divided into metallic and non-metallic, the line of demarcation is not very clearly defined; and it is not impossible that Grahame, and those who think with him, may be right in supposing hydrogen to be a metal. Although we are accustomed to think of metals as solid bodies, we readily admit the claim of mercury to a place in the class, and it is not much more difficult to extend our belief to the possibility of a metal existing at all temperatures in the gaseous form. Admitting, then, the possibility that hydrogen is a metallic body, it requires no great stretch of the imagination to suppose that four atoms of that metal may combine with one atom of nitrogen, and thus fulfil all the conditions o ammonium. In other words, it is fairly within the range of possibility that the hypothetical metal, ammonium, may really be metallic hydrogen modified by combination with nitrogen.

Be this as it may, there is no doubt that ammonia, in the form of a chloride (*sal ammoniac*), has been known for a long period, having been produced by the Arabs in the Libyan desert from the soot of the camels' soil used as fuel. Although as ammonia it does not exist to any great extent in animal or vegetable matter, it is always formed as a result of their decomposition even at ordinary temperatures, but especially when much heat is applied, the nitrogen readily liberated from many of its unstable compounds combining with the hydrogen to produce it. In this way it is always formed during the destructive distillation of wood, bones, horn, &c., &c., and some of its popular names, such as "hartshorn," have been derived from these sources of its manufacture. At the present time it is almost exclusively made from the ammoniacal liquor given off during the manufacture of coal gas, the small quantity of nitrogen contained in the coal combining with some of the hydrogen and forming NH_3.

At the chemical manufactory we visited the ammoniacal liquor was placed in a large iron still, or rather tank, with an air-tight cover. From this an iron tube was led into a wooden vessel containing a mixture of sulphuric acid and water, kept in constant motion by a stirrer. On the application of heat to the still ammonia in the form of gas came over, and was at once neutralised by the sulphuric acid, giving rise to the formation of ammonium sulphate, which, as the solution became saturated, was removed by a perforated shovel or scoop, and placed so that the superfluous liquid could be drained away. The great bulk of the salt thus produced was sold for agricultural purposes, but a portion was used in the production of solution and carbonate of ammonia.

For these purposes it was dissolved in water and recrystallised, then mixed with an excess of freshly-slacked lime and subjected to distillation, when ammoniacal gas came off steadily. It was first passed through a small quantity of water, by which it was freed from solid particles and certain impurities, and then passed into a series of some half-dozen large Woulff's bottles filled with pure water. As the process proceeded the bottle next the washer became saturated and was removed, the one next it taking its place, and the one removed, after being emptied and refilled with water, became the sixth of the series. In this way water may be made to dissolve 700 times its own volume of ammoniacal gas; but the aim of the manufacturer is to make a solution having a specific gravity of ·880, each cubic inch of which holds exactly 360 inches of the gas.

Although, however, the manufacturer generally produces a solution of the standard strength, experience shows that the article, as supplied from the shops, is not by any means uniform. Of a number of samples collected from various quarters not one was up to full strength, and several fell very much below it. This, of course, arises from the ease with which the solution parts with the gas, especially in situations where the temperature is high; and this should be kept in mind, as it will, no doubt, often influence the development when much below the expected strength.

In the manufacture of carbonate of ammonia the purified sulphate is intimately mixed with carbonate of lime or chalk, and placed in iron retorts similar to those used in the manufacture of coal gas. The pipes from the retorts pass into large cylindrical leaden receivers, in which the volatilised carbonate is condensed. This is purified by sublimation in iron pots with conical leaden heads, and heated by steam. The heads are removed from time to time and emptied of the sublimed carbonate.

There are in reality a variety of ammonium carbonates, but only two are worth notice here—the *bicarbonate*, $CO\ (NH_4)\ H$, and the *sesquicarbonate*, $(CO_3)_3\ (NH_4)_4\ H_2$. The carbonate of commerce is a mixture, or, perhaps, to speak more correctly, a compound of those two, and, when fresh and well made, always contains thirty-three parts of the former to sixty-seven parts of the latter. By exposure to the air ammonia is given off and carbonic acid absorbed, and the whole becomes converted into the (for photographic purposes) almost inert *bicarbonate*, and thus arises almost the only objection to its use in the developer.

In a former article on this subject we stated that the sesquicarbonate would keep indefinitely in solution; but recent experiences have very much modified that opinion. Of several solutions we have had in use for some time some are nearly useless from decomposition, while others are much weaker than when first tried; so that we must recommend the carbonate to be kept in well-closed bottles, in lump, and only dissolved in quantities sufficient for immediate use.

QUICK EXPOSURES IN THE STUDIO.

The Editors gave us some interesting chapters on instantaneous photography a few weeks since which could be read with advantage by all, and their suggestions that some one should take in hand the production and publication of a series of pictures taken in a fraction of a second of time, which would include subjects hitherto not undertaken by anyone, is well worthy of consideration. The difficulties in their path are neither few nor slight; but, once the utmost perfection of mechanical arrangements is obtained and existing processes made use of in their most perfect form, I see no insuperable obstacle in the way. I come to this conclusion from my own experience in the studio without any specially-arranged chemicals. I take a very great number of children's pictures, and am usually successful with them, as on bright days an exposure of a quarter of a second will always secure me a passable result.

To obtain pictures of this degree of rapidity everything needs to be in perfect order—chemicals, apparatus, &c., and, if one may so express oneself, the light also. This same thing has been said, no doubt, scores of times; still the experience of every worker is of value, and it is in the collection and comparison of the results of many minds that information is to be obtained. I thus propose to briefly describe my method of working.

A point of very great importance is the cleanliness of the glasses. A plate which under ordinary conditions would develope clean and free from spots would, under the sometimes necessarily protracted development of a brief exposure, produce fog and stain enough to ruin the picture. The form under which improperly-cleaned glass oftenest shows itself is as a metallic deposit lying directly on the glass, between it and the film. The negative, when looked through, does not seem to possess any very badly-defined fault, and there are times when this deposit will scarcely show at all while the negative is wet, but the moment drying takes place the coherence between the film and the glass is destroyed. The former splits and flies away from the glass as it does under no other circumstances. It is impossible to keep it down till it is dry; and when a negative which appears to be a promising one has been taken it is very annoying to find that this deposit has made its appearance. With the utmost care it is liable to occur. The remedy I have adopted when I have seen this defect in a negative has been to flood it with spirit and allow it to soak for a few minutes; then to drive off the spirit with varnish and at once hold it before a hot fire. The deposit will occur oftenest in glasses that have been already used and not thoroughly cleaned before being used again.

The Bath.—For this class of pictures it is always most desirable to have two baths, the second a little weaker than the first; twenty or twenty-five grains to the ounce will suffice, if the first be thirty or thirty-five grains. By this means you get the sensitiveness of a strong bath with the cleanliness of a weak one. I keep each very faintly acid with nitric acid—just sufficient to turn the colour of litmus-paper.

I may here say that I never yet found a doctored bath work as quickly as a new one; and if I wanted the very highest degree of sensitiveness attainable for any special occasion I should prefer an absolutely new and unused bath. I have tried baths treated in every way, but I have always returned to a comparatively new bath whenever I wanted the choicest results. I make it by one of the oft-repeated methods. Dissolving the silver in a small quantity of water, I take two-thirds of the solution, and drop in a few drops of solution of potassic iodide, then fill up to the required bulk with water, allowing for the third part spoken of, which is added after the bulk has been filtered. Two, or, at most, three, drops of nitric acid are then added, and, after well mixing, the bath is finished, ready for use at once.

The Collodion.—I have not confined myself to any particular make, and have used my own, as described in previous volumes of The British Journal of Photography, or that of some advertised makers with equal success, though I must say that I have found a little difference in the relative sensitiveness of various makes of collodion. In that made by myself I have preferred a cotton made at a temperature of 140° and with not too great a proportion of sulphuric acid. It should be recently sensitised, as the least tendency to "ageing" is quite inimical to the attainment of exalted sensitiveness. I do not by any means recommend it to be specially heavily iodised, for my own experience points to the conclusion that thin plates are, at least, quite as sensitive as the very thick, creamy-looking ones.

Developer.—This I use in discretion. I always keep a store of thirty-grain developer—simply iron and glacial acetic acid in the proportion of an ounce and a-half of acid to an ounce of iron. Spirit I never use; when the bath gets so charged as to require spirit in the developer to make it flow I reject it, or use it as a first bath and reject the first. In quick exposures with children one often can tell that sufficient time has been given, while in the others the plate has only obtained a minimum of exposure. In the former case I dilute the developer to two-thirds its strength, *i.e.*, twenty grains to the ounce; in the latter I use the full strength, and keep it on the plate till no further addition is made to the image. It is at this point that the state of the bath tells; a newly-made one, or one not in use a very long time, permits the developer to remain without fogging for a very much longer time than a well-worked one, or, I may say, a well-doctored one—the latter generally bringing up the intensity as far as is required before the image is entirely brought out. Care is needed in pouring it on to see that the developer in the glass contains no bubbles, as with a solution of this strength line marks of greater opacity are caused by the passing of the air-bubbles on the surface of the developer across the collodion film.

Fixing.—As a rule hypo. is always used in my studio, and cyanide only resorted to in extreme cases; but for those quick exposures where it so often happens that a little under-exposure characterises the negative, an unmistakable advantage is gained by the use of cyanide, but only in cases of slight under-exposure. A properly-timed picture is fixed by hypo. with equally good results. If anyone

have any doubt about this property of cyanide let him take a negative slightly under-exposed, and, after fixing with hypo., flood with cyanide solution for a moment, and then wash the surface. The image will be made lighter in colour, and upon looking through it will appear to have the effect of a longer-exposed picture; the developer would seem under such circumstances to deposit with the image a precipitate having organic characteristics which give the effect of a greater hardness. The application of cyanide seems to dissolve this foreign matter and leave the pure image in its integrity behind.

A word about the light and I have done. I have before, in these pages, explained the construction of my studio and shown how I have power to use a south light. For quick pictures I make this light my dominant one, and the more subdued light from the north forms the shadows. I draw back most of my curtains, except the one immediately overhead, and often I throw on the ground in front of the sitter the white screen I usually adopt for side reflection.

It is one thing to take a quick picture as a *tour de force*, when a rapidly-moving object can be seen and only seen, and another to take a well-modelled face, with limbs and drapery fairly well brought out, and not mere black patches of shadow. It is the taking of such a properly-graduated picture that I have attempted to describe in brief.

G. Watmough Webster, F.C.S.

ON THE PREPARATION AND COLOURING OF TRANSPARENCIES FOR THE MAGIC LANTERN.

Chapter IV.—Colouring—*(Continued.)*

Suppose, now, that a figure subject with landscape background is to be coloured, and that the effect wanted is a sunset. The first part of the picture to be done is the sky. Turn the slide upside down, and commence printing the sky from the horizon. Before doing so it may be as well to state that it is not necessary to follow with the colour the outline of hills, trees, &c., which may be against the sky. A clean, decided, and level piece of colouring cannot be done in this way, as certain tints which may be used are supposed to pass horizontally behind the hills or trees, so that the effect of following the outline would be that the sunset would appear to rise or fall according to the height of the object behind which it was painted; therefore the colour must be taken straight across hills, trees, and everything if necessary.

Having mixed together Italian pink with a little rose madder commence laying on the colour at the horizon, graduating into pure yellow as it approaches the zenith, laying the colour smoothly on much thicker than would be used for painting on paper, and about the consistency of cream. When this is done change the brush, take Prussian blue, and continue down to the bottom of the slide as it now stands. When commencing to lay on the blue do not join it with the yellow at this stage; leave a small space, as the colours being wet the one would run into the other. When nearly dry, but while still moist, the dabber now comes into use. Apply the clean dabber to the blue part of the sky, and keep dabbing on until the whole is quite level, but graduating from a very light blue where it joins the yellow down to a deep blue at the zenith. When the whole is dry the blue must now be joined with the yellow until it fades away into that colour. This is done by using another clean dabber of a smaller size and breathing upon the slide; the colours will be sufficiently softened by the moisture of the breath to allow the colours being joined together without the danger of one colour soiling the other. The slide may now be turned the proper way, and any imperfections will be at once seen. If at any part of the sky the colour appear too deep, by breathing upon it and applying the dabber as much colour may be removed as is required. With a clean, moist brush, having a good point, the parts of the surrounding objects, which have been tinted by the sky colour, may now be wiped off, as it only requires a slight touch of the brush to remove the colour. The brush must not be wet, but just moist enough to lift the colour.

In cleaning the hills, trees, or anything else never draw the brush round the margin of the object, as this would pile up the colour round the object, and make a nasty, hard outline. The proper way is to draw the brush from the margin inwards; but this must be done so that none of the sky will appear to be wiped away outside the object which it surrounds. Colourists of *cartes* will understand this quite well, as they are accustomed to wipe the background colour from off the hair or face of the portrait. As a rule it would be as well also to remember that *one stroke of a wet brush will not remove the colour, but the second will;* and it is on this principle that I advise finishing a slide fully before varnishing, as a picture may be worked up to any extent as easily as a *carte*, provided this rule be kept in view.

Having cleaned the slide as desired, if there be any cloud effects they must now be wiped out with the damp brush, drawing the brush from the outline of the cloud to the centre, as before stated. Having done this, if the outline be at all hard breathe upon it and apply the dabber. Tint the high lights of the clouds with a warm tint of rose madder and yellow, and put in the shadows with purple—say, Payne's grey—with a little rose madder, softening all with a clean dabber where the marks of the brush are seen. Any purple streaks of clouds which may stretch across the horizon can be put in without wiping out by merely laying the colour on the top of the one below, making allowance for the effect which the colour already laid will have upon that which is to be laid on. For instance: if a bluish-purple streak be required allowance must be made for the rose madder already in the sky at the horizon, so that an almost pure blue will be sufficient to produce the effect. In laying on these colours avoid too full a brush and watery tints. Where a light or delicate tint is required the colour must be mixed on the palette, the brush washed, and very little colour taken on the brush at a time, as a thin wash of colour will colour a greater surface than where the colour is thick in the brushes.

The sky having been painted put in the hills and distant part of the background, and, to keep the sunny look, remember to colour the high lights warm and the shadows cool. The reverse of this is the case in moonlight views. The background being put in the figures must now be cleaned and the faces painted. For men use rose madder and burnt sienna, carrying the colour over the whole face and neck; with the same brush gather the colour from the high lights to those parts which require to be deeper in colour, and, while still moist, dip the point of the brush in rose madder and put it on the cheek. Lay the slide flat to dry, and the colours will blend together of themselves much softer than could be done with the brush. Go over all the figures in this way, and never mind although the skin tint should come over the hair or drapery, as these have to be painted. It is better to do this than have hard outlines and brush marks. When once a part is painted all care must be taken that any other colour does not run over it.

Having cleaned any of the skin tint from off the hair and drapery, colour the hair of each figure, where there is a number, with an appropriate colour. Avoid having them all one tint. Beautiful golden hair for fair ladies may be put in with brown pink or burnt sienna, or burnt sienna and Italian pink. For brown hair use sepia, and for black hair sepia in the shadows, and for the high lights Payne's grey. The figures in the foreground must always be coloured much stronger, or with a deeper shade of colour, than those in the background or at a distance. This applies to every part of the picture, such as the drapery, hair, skin, tint, &c.; and the details of the figures in the foreground must also be more marked or defined in the details.

In painting the draperies colour the farthest back figures first, painting them in lightly with secondary colours in keeping with the backgrounds, reserving the most brilliant and telling colours, which are the primaries, for the principal figures in the picture. If possible avoid painting separate figures with the same tint of colour, which can be easily done, as where the dresses are absolutely the same, such as in a body of soldiers. The fact that some must be nearer and some further away makes it imperative, in order to preserve the perspective, that those in the distance, as already remarked, be coloured with a feebler or lighter tint than those in the foreground.

The next thing is to preserve perfect harmony in the colours which come next one another. In colouring slides, however, an exaggerated style must be adopted, remembering the purpose for which they are to be used. For instance: a *carte de visite* is coloured exactly as it is to be seen. With a slide the case is different, as this small square of glass is to be used to colour a large sheet, say ten feet square; so that if a slide were to be coloured in delicate tints, such as are used in colouring *cartes*, when shown on the screen the colours would be so much diluted by being spread over such a large surface that they would scarcely be visible and would appear "wishy-washy." Remembering this, keep the colours much stronger than would be required in an ordinary water-colour painting. Having coloured the figures in the background finish up with those in the foreground; and, as great licence may be taken in painting any fancy pictures, let the most brilliant colours be used—which will not only attract the eye to the principal figures, but will also cause all the others and the background to recede—such as crimson lake, Prussian blue, or crimson lake with a little sepia, and also Prussian green, pure gold ornaments or trimmings being coloured with brown pink for the shadows and Italian pink for the high lights.

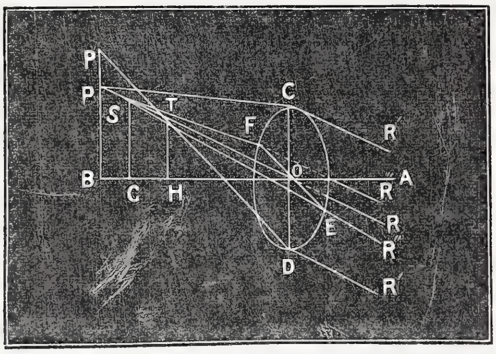
Thomas Ross.

ON LENSES.*

We come now to the last of the more important aberrations, that is, the astigmation—a word coming from the Greek, meaning not coming to one point. If we focus a well-defined, round object, situated in the axis of a lens of a wide aperture, on a screen, we find the image round. Even if we move the screen in and out of the focus the image will get only less sharp; but if we turn the lens side ways, so as to get the image of the same object formed by pencils oblique to the axis, then we will observe that it is no longer possible to form a sharp image of the object, and by moving the screen in and out of the focus the image appears elongated, horizontally or vertically.

Now let us see whether it can be made clear in the following figure (27). C D is a convex lens, of which A B is the axis. The

FIG. 27.



lens is represented in perspective, as we have to show two planes in different directions. The radiating point R is situated at infinity and outside of the principal axis. We will lay a plane through the axis A B and the point R, which will cut the lens in its diameter C D. Let us lay another plane through the point R at a right angle to the former, which will cut the lens in its diameter E F. If we draw the line R p through the optical centre of the lens a ray following it would not be refracted, as we have seen before, and constitutes a secondary axis. R p is the line where the two planes cut each other, and consequently belongs to both planes. Let us draw the two extreme rays, R′ C and R′ D, of the diameter C D, which, after refraction, are T and p', as we learned by analysing spherical aberration. If we now look to the other plane the rays R″ F and R″ E are symmetrical to the axis and are exactly equally refracted, meeting at the point S. If the lens be now diaphragmed down, so as to improve the aberration of the plane C D, we find that we have for one lens two distinct foci. If we focus, for instance, a brick wall we will have the horizontal white mortar lines in focus, while the vertical ones are out of focus, and *vice versâ*. By looking to the figure you can easily see that that universal doctor in optics, the diaphragm, will also cure astigmation—at least will bring it to a minimum. *Fig.* 26 will suggest a way by which astigmation may be destroyed almost completely. The diaphragm D divides the lens L into an infinite number of lenses, of which each acts on a different radiating point, and the pencils, in or out of the axis, strike the lenses almost normal; hence such a combination is not only nearly free of distortion, but of astigmation also.

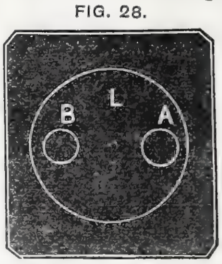
Many of you are aware that in nearly all human eyes there exists an aberration, also called astigmation. Although in its effect similar to the astigmation of lenses just mentioned it is of a different character. Nature intends that the curves of the cornea and crystalline lens of the human eye should be spherical; but the exceptions seem to be the rule. The curves of the cornea and crystalline lens of the eye are, in nearly all cases, more or less elliptical, egg-shaped, and consequently have in one meridian a longer focus than in the other. If such an eye bring the image of a line parallel to one meridian to a focus at the retina, the images of lines parallel to all the other meridians do not collect at the retina, especially the one at right angles to the former, and a distorted, blurred image is the result. The advancement of science has lately enabled our oculists to correct this evil by spectacles, of which the glasses are parts of cylinders instead of spheres.

Now, knowing all the defects of lenses and the different modes of correcting the same, let us look back to that primitive instrument—the pinhole camera. The pinhole camera is free from all such errors as spherical and chromatic aberrations, distortion, curvature of field, and astigmation; and the only objection against it is the extremely small aperture. What an amount of speculation and hard labour of the most eminent men was necessary to furnish a substitute, equally free from errors, having a larger aperture, giving a brighter image! And, even now, none of the aberrations can be completely corrected, and the best that can be done, and that for a limited aperture only, is to reduce the errors so far as to diminish their extension, so as to make them appear to our eye at a smaller angle than the eye is able to distinguish. In lenses used as objectives, where the image is magnified by high eyepieces, even that is extremely difficult, as the errors are also magnified. Our most celebrated opticians, such as Fraunhofer, never attempted to give a telescope objective a larger aperture than the focus divided by ten, except in very small pocket telescopes; and his larger telescope—the one he made for the Dorpat Observatory, and which he considered his best objective—has a focus of 160 inches, while the aperture is only 108 lines—that is, one-seventeenth of the focal length—and its highest magnification is 720 times. The larger telescopes of Dollond are nearly twice as long. The same artist (Fraunhofer) took precaution to warn young opticians and amateurs not to listen to the very natural desire to try their skill on larger apertures and giving higher magnification, if they do not wish to be disappointed and lose time and money; but the school of experience seems to be the only one to cure this desire.

But here I feel bound to mention that, a few years ago, Mr. Steinheil, of Munich, read a paper before the Academy of Sciences of that city, on an improved telescope objective. It is composed of four lenses—one positive crown glass lens, combined with a compound negative lens, which itself is a triplet of two flint and one crown glass lenses. By this formula a four-inch telescope is only two feet long, while in the ordinary way it is twice as long.

While I am speaking about wide apertures I cannot pass without mentioning a very serious obstacle connected with large apertures; it might be called the parallactic error. I was frequently asked why a large photographic objective does not give the same sharp image that a small one does. It is somewhat more difficult to correct a large objective than a small one, even if the aperture stand in the same relation to the focal length. But it is not only this. Suppose we have a large photographic objective, say of six inches aperture, L (*fig.* 28). Each part of the lens receives radiating rays from each point of the object, and brings them to a focus at the respective place. Now, if we cover the lens by pasting paper over it, leaving only the aperture A free, we still get an image, only more feeble in light. Again: cover the aperture A, and open the aperture B, you get an image of the same object; but the apertures A and B are, say, four inches apart. Both cannot give precisely the same image, as they are taken from another base. The images will be similar to the two images of a stereograph, which are taken in a similar way by two lenses. Now open both apertures, A and B, and as the images are not equal they cannot cover each other, but will overlap, especially the images of the nearer objects. If we now use the whole aperture of six inches diameter it is clear that we will have an infinite number of images none equal to the other, everyone overlapping the other, and the image, necessarily, must be a blurred one. For this there is no remedy but cutting down the aperture.

FIG. 28.



Ladies and gentlemen, we have now a reasonable knowledge of what a lens is, and I would now like to pass on to the more interesting part of optics—to the combinations of lenses—such as the telescope, the microscope, and camera, which not only have given us so much pleasure, but have enlarged our knowledge so wonderfully; but this would require more time than we have on hand tonight, and I will not tax your patience any longer, but thank you for the attention you paid to the rather wearisome subject, and for the interest with which you followed the lecture during the evening.

JOSEPH ZENTMAYER.

* Concluded from page 415.

PHOTOGRAPHIC PORTRAITURE.

Chapter II.—Some Lessons from Sir Joshua Reynolds.

Sir Joshua Reynolds was wont to say to the students of the Royal Academy that, although invention was one of the great marks of genius, experience invariably showed that it originated in being conversant with the inventions of others, just as by reading the thoughts of others we learn to think. In his sixth discourse he says:—

"The greatest natural genius cannot subsist on its own stock; he who resolves never to ransack any mind but his own will soon be reduced from mere barrenness to the poorest of all imitators—he will be obliged to imitate himself, and repeat what he has before often repeated."

And again, in his second discourse, he says:—

"Invention, strictly speaking, is little more than a new combination of those images which have been previously gathered and deposited in

the memory. Nothing can come of nothing; he who has laid up no materials can produce no combinations."

When Reynolds entered the studio of Thomas Hudson—the fashionable portrait painter, whose "fair-tied wigs, blue velvet coats, and white satin waistcoats" still adorn many a family collection, and are so often seen, multiplied in Faber's once celebrated mezzotints, amongst folios of old prints—portraiture, for want of invention, had degenerated into a species of manufacture. Hudson usually painted the head himself in his own particular way, leaving to his assistants the painting of the drapery and eternal backgrounds in their particular ways, and the result (as you may know) was heavy, insipid, feeble, and monotonous in the extreme. When the youthful Joshua had been two years under Hudson his superior feeling for art was apparent in the attempts he made to infuse invention into his productions, and so escape from the wretched mechanical taste of those paintings which were held up to him as the highest examples of art in portraiture. Hudson's patrons hailed the ambitious youngster's daring innovations with delight; and the former, having been long without a rival, was so deeply mortified by them that he made a prompt excuse for quarrelling with and dismissing his pupil. Sir Joshua used to regard this as one of the most fortunate events of his life, for the defects he had acquired from his instructor gave him quite enough to unlearn, and a longer stay in his studio could only have strengthened them.

It seems to me that photographic portraiture is now, for lack of that quality which Sir Joshua called "invention" (of which I spoke more fully in the first chapter of this short series of papers) in Hudson's studio. We want a new photographic Sir Joshua, who will get photographic portraiture out of the old ruck as quickly as possible, and infuse into this branch of the art more invention. This is the first lesson we glean from the grand old portrait painter, and it is "drawn from the life." Turn now from the man's life to his works, and through his thoughts some of us may learn to think.

Sir Joshua owed those ideas which rendered him dissatisfied with Hudson's style of portraiture partly to an old *Treatise on Painting*, written by Richardson, under whom Hudson had studied, to which I shall have occasion in another paper to refer; and partly to studying portraits painted by a talented, unknown Devonshire painter. "This painter," says Northcote, "was William Gandy, of Exeter, whom I cannot but consider as an early master of Reynolds. He told me himself that he had seen portraits by Gandy equal to those of Rembrandt." A painter of our own day, the late C. R. Leslie, R.A., said he had seen a portrait by Gandy which he could have mistaken for an early work by Reynolds; and Gandy probably derived his style and taste from the teaching of his father, who was a portrait painter of great talent and a pupil of that famous painter whose works my last paper treated of—Vandyke. "Thus," as Leslie says, "while the style of Vandyke degenerated through the hands of his successors in the capital till it was totally lost in the beginning of the eighteenth century, many of its higher qualities were preserved in remote parts of the kingdom, to lead to a splendid revival of portraiture; so true it is that, however obscured from sight, at times, some of the links in the chain of art may be, still it is a chain never wholly broken." Comparing Hudson's portraits with Reynolds the same practical and eminent authority says:—

"When we compare his style with that of his master, Hudson, we are struck with its vast superiority, its wide difference, not merely in degree, but in kind; and in this it would appear to form an exception to what has generally been the case, namely, that the style of every extraordinary genius is but a great improvement on that of the school in which he was reared. * * * I never saw so delightful a display of pictures as the assemblage of the works of Reynolds in 1813, at the British Gallery, nearly all being portraits."

In looking over prints from his works, you will be struck by the many attitudes and incidents they display, and yet these are often such as, from their very familiarity in life, have been overlooked by other painters. For instances we may point out the three Ladies Waldegrave—one winding silk from the hands of another, while a third is bending over a drawing; Mrs. Abingdon, the great actress, leaning on the back of her chair; and Lady Fenoulhet with her hands in a muff, together with the many exquisitely natural groupings of mothers and children, and of children with children. In no other great painter's works, perhaps, can be found so great a diversity of individual character, or a more striking diversity of incident. So in the treatment of light and shade, instead of the endless sameness of the Hudson school of art we have constantly differing effects. Hudson would have regarded as downright heresy the casting of partial shadows from overhanging foliage over whole length figures, yet how charming such effects are in some of Reynolds's portraits! Mr. Leslie thought we might learn nearly everything relating to portraiture from the study of Reynolds in his writings and works, and on this subject of shadow you may read what the great portrait painter himself says in one of his famous "discourses:"—

"I am no enemy to dark shadows. The general deficiency to be observed in the works of the painters of the last age, as well as, indeed, of many of the present, is feebleness of effect; they seem to be too much afraid of those 'midnight' shadows which alone give the power of nature, and without which a picture will appear like one wholly wanting in solidity and strength. The lightest and gayest style requires this food to give it force and brilliancy."

Burnet, in his articles on "Portrait Painting in England, speaking of Sir Joshua, and comparing him with Vandyke, says:—

"Vandyke received his instruction in the school of the greatest master of the mechanical part of the art that, perhaps, ever existed, and painted at a time when the dress and fashion were peculiarly adapted for the picturesque representation of his figures, and must have in many instances engendered ideas conducive to the excellence of his works. Compared with such transcendent advantages the education of Reynolds was a blank. At seventeen he was placed with Hudson, a man who knew little and taught less; and at twenty years of age commenced a painter of portraits with merely a knowledge of mixing the colours. * * * On comparing his heads with those of Vandyke the process is evidently different; for, whereas Vandyke drew in the features and minute parts, Reynolds leaves them pronounced by the shaping out of large masses of light and colour, there being no outline in nature but what is produced by varying tints."

If we critically examine the portraits of Reynolds we shall find them characterised by many of the more important qualities of Vandyke's treatment, more especially that largeness of which I spoke in my former paper. The light falls upon the heads and figures at angles which ensure unity in the chief masses of light and shade. Shadows and their half-tints are grouped together, and the backgrounds serve the same end. We have, consequently, a mellow richness and quiet softness, instead of hard, contrasting edges and isolated spots of light and dark which, especially in photography result from a contrary style of treatment.

To understand more definitely Sir Joshua's principle in lighting, take a plaster cast of some head and place it so that the light falls full upon it, casting the shadows upon those surfaces which retire from the eye and are mostly unseen. The features will, consequently, be marked with extreme delicacy of shadow and half-tints, the high lights will be diffused and weak, and no touches of extreme dark will give the features force and relief. Turn the cast but a little from the light and the whole effect becomes changed entirely. The shadows and their half-tones melt one into another, the features appear distinctly marked, the individuality is more apparent, and the whole effect is bolder and more striking, firmness and dignity taking the place of vapid softness and puny delicacy, the likeness being more readily detected, and the character of the head and its expression at once more definitely pronounced. This is a simple and single practical illustration; but it shows the value of that principle of giving like to like in broad masses which Sir Joshua wisely adopted and carried into every portion of his work. Draperies, backgrounds, and accessories all partook of it, and there is a grandeur associated with simplicity in the general effect which has been universally admired by the best and highest authorities.

In depicting beautiful women it might be argued that these qualities of depth and force should give way to those of a softer and more delicate character, but they do not in Reynolds's works; and yet what painter has given the eloquence and refined grace of female loveliness with that bewitching perfection which we find in his works? Sir David Wilkie says, in his remarks on portrait painting:—"No representations of female character have equalled in sweetness and beauty the female portraits of Sir Joshua Reynolds.'

It was said by Sir Walter Scott, amongst others, that this grace and elegance were secured at the expense of likeness; but even if this were the case—which I strongly doubt—it was not necessarily true. Leslie said:—

"That the portraits of Reynolds were the best of all likenesses I have no manner of doubt. I know several of his pictures of children, the originals of which I have seen in middle and old age, and in every instance I could discover much likeness. He painted Lord Melbourne, when a boy, and with that genuine laugh that was so characteristic of the future prime minister at every period of his life; and no likeness between a child and a man of sixty (an age at which I remember Lord Melbourne) was ever more striking. Lord Melbourne recollected that Sir Joshua bribed him to sit by giving him a ride on his foot, and said 'If you behave well you shall have another ride.'"

"Reynolds—great and graceful as he paints," said Sterne, and in these words described both the artist and his works—was daily

accessible to young artists who sought his advice, and readily lent them the finest of his own works; but in doing this he always said to the portrait painter:—"It will be better for you to study Vandyke."

It would be impossible, without standing before the mighty originals, to point out all the excellences of Sir Joshua's style of treatment in portraiture, and it would occupy more time than I can at present spare to practically illustrate the extent of the photographer's power of imitating it; but if I lay down briefly in a series of practical hints the chief characteristics of the great portrait painters' works it may assist young art-students to pursue photographic portraiture artistically and with higher motives than are commonly adopted, and in these few chapters this is the whole extent of my aim. I therefore hope that those who expect more will accept this statement as a reason why they should not be disappointed. The masters I shall select will be those whose works exist in our public collections, and in prints which are accessible to all who reside in London and other large towns, or who possess the means for collecting good engravings from the original paintings.

A. H. Wall.

LICHTDRUCK.

The present perfection and practicability of lichtdruck, as shown by the illustration issued by Herren Branneck and Maier, which accompanied our first number, will be my excuse for giving a comprehensive sketch of the principal points of the process.

It is not my intention to go back upon the first experiments with chrome gelatine made by Nièpce de St. Victor, Talbot, and others, nor yet to the more developed process of Tessie du Mothay; the end I have in view is to bring before those interested the processes which have come into use since Herr J. Albert, of Munich, by perfecting the lichtdruck process, made it suitable for commercial purposes.

Everyone knows nowadays that dry gelatine impregnated with bichromate of potassium has the property of becoming, when exposed to light, an insoluble mass which cannot again swell like ordinary gelatine. If a film of bichromated gelatine be dried upon a substratum and then be exposed to the light, part of the film being exposed the whole time, part for a little time, and part protected altogether, a film will be obtained which, when moistened with water, is capable of taking on fatty ink in different gradations.

On rolling the film with a leather roller charged with lithographic ink the unlighted parts, owing to the water they contain, refuse to take on the ink; the less-exposed parts take on a light tint, while the portions that have received a long exposure take a deep tint.

It is upon this principle that all the lichtdruck processes for printing direct from bichromated gelatine films are based. In the earlier experiments it was supposed that a practicable process could only be got which complied with the existing lithographic conditions. It was assumed that no fatty ink could be equally rolled over the lighted parts unless the film itself contained a fat or resin. From this hypothesis the earlier and complicated processes arose, of which that of Herr Gemoser, in 1869, may be taken as an example.

Solutions to be Prepared Separately.

1. 8·75 grammes of gelatine dissolved in 150 grammes of warm water.
2. 3·75 grammes of isinglass dissolved by boiling in ninety grammes of water.
3. 60· grammes of egg albumen beaten to a froth in sixty grammes of water and filtered.
4. Water tincture:—

Myrrh gum	2	grammes,
Ammoniac gum	0·75	gramme,
Liquorice root	3	grammes,
Manna	0·75	gramme,
Cane sugar	0·75	,,
Milk sugar	1·50	,,

dissolved in 120 grammes of distilled water.

5. Bichromate of potash	4·75	grammes.
Bichromate of ammonia	2 75	,,
Water	120	,,

6. Ammonia.
7. Spirit of wine tincture:—

Lupulin	3·75	grammes.
Myrrh gum	3·75	,,
Benzoic resin	2·25	,,
Tolu balsam	1·50	gramme.

8. 07·5 grammes of nitrate of silver dissolved in sixty grammes of distilled water.

9. Cadmic iodide	0 25	gramme,
Cadmic bromide	0 125	,,
One per cent. gold solution	3 drops,	

dissolved in thirty grammes of water.

Before use the separate solutions were mixed in the following proportions:—

No. 1. Gelatine solution	120·	grammes.
2. Isinglass	76 50	,,
3. Albumen	22·50	,,
4. Water tincture	22·50	,,
5. Bichromate of potassium and ammonia solution	25·	,,
6. Ammonia	6 drops.	
7. Spirit of wine tincture	7·50	grammes.
8. Silver solution	2·	,,
9. Iodine and bromine solution	4·	,,

For this old Gemoser process the plates were only prepared with one film. Thick plates of ground glass, coated with the sensitised gelatine, were placed horizontally, by means of iron trivets, adjusting screws, and a water level, in a drying box, and dried at a temperature of about 50° R.

When the plates were dry and had cooled again they were exposed under a negative until the picture was printed deep enough, the depth being ascertained by looking through from the back of the glass plate, a little practice enabling one to judge.

After printing the plates were laid in water for about half-an-hour, and frequently moved in order to remove the chrome salts, after which the plates were removed, and laid out to dry of themselves. The dry plates were covered to a depth of one centimètre with a coating of flour, applied by means of a sieve, and laid upon iron trivets in the firing oven and slowly heated to 100° R. in order to coagulate the albumen, and by melting the resin cause it to adhere more firmly to the glass. The firing oven is of a similar construction to that of a confectioner's.

The plates were left to cool gradually in the oven, freed from the covering of flour, cemented, picture side uppermost, with gypsum to a lithographic stone, and were then ready to print from.

Very good results were obtained by this process, but it was difficult to hit the exact degree of heat required. If the plate were too strongly heated the film would absorb no more water, and, consequently, the lights took on a little colour when the plate was inked, and the hollows wanting depth the shadows wanted power, and the picture was monotonous. If the plate were not sufficiently heated, then in printing the film did not adhere properly to the glass.

On account of these drawbacks the one-film process was speedily abandoned, as were also the resinous and saccharine ingredients in the solution, they being afterwards seen to be absolutely useless.

At present, with these exceptions, the foregoing formulæ are used for the second film, the plates being previously prepared with the following under-film, in order to secure the adhesion of the second film to the plate, so that the strong heating can be omitted:—Dissolve six grammes of gelatine in 270 grammes of warm, distilled water; when dissolved add 5·50 grammes of bichromate of potash. Beat up 112·50 grammes of egg albumen, without the addition of water, until the froth is quite stiff; then add the sensitised gelatine, not too warm, whip up the whole thoroughly, and let stand some hours. Filter before using. To use it pour the mixture upon the ground glass, helping it to spread with a strip of paper or a glass rod, then dry the previously-levelled plate in a drying box at a temperature of from 20° to 25° R. Now lay the prepared plate in a printing-frame, cover the film with a black cloth, shut the frame, and expose the wrong side of the plate for half-an-hour in diffused light. Plates may be prepared in this way several days beforehand.

To proceed with the preparation of the printing plate:—Warm the mass which is to serve as the second film to 45° R. and filter. Then lay the plates, prepared as above by having the wrong side lighted, in a flat dish containing water of 40° R., and move them about for a few minutes in order to swell the film and thereby give it the capacity for combining with the second film. Part of the water having been drained off the yet warm and moist plate, the mixture which is to form the second film is poured copiously on to the middle and spread by tilting, a little being allowed to run off at each corner in order to remove the water from the edges. The plate is then dried in the drying-box at a temperature of about 40° R.

The lichtdruck process gained considerably in reliableness through the simplification introduced by Herr J. Albert. In the accompanying formulæ, as used by Herr Albert, all the unnecessary materials used in the process as first described are left out, and they are, as yet, the formulæ by which, with proper attention and manipulation, successful results may best be obtained.

FORMULA FOR THE UNDER FILM (FIRST FILM):—

Gelatine, dissolved by gentle heat in 270 grammes of water	10	grammes.
Bichromate of potassium, dissolved in 270 grammes of water	10	„
Albumen, beaten to a froth	270	„

Mix together, beat up thoroughly, and filter warm. Place plates of polished plate glass, previously well cleaned with ammonia, level in the drying-box and warm them; then pour the gelatine and albumen mixture over it as directed before, assisting it to spread with a broad flat brush. When smooth plates are used the first film should be somewhat thinner than when matt plates are used. These plates are dried at a temperature of 35° R. The mixture for the first film may be used for some time. Cold stiffens it into a milky jelly, which must be warmed and filtered before use, care being taken not to heat it above 40° R. on account of the albumen it contains. The plates being dry the film side is laid upon cloth or velvet and the glass side is exposed to the light. At the same time a Vogel's photometer, in which a piece of paper coated with the first film mixture is placed, is laid beside the exposed plates. The plates are left until No. 12 of the photometer becomes visible, when they are placed in cold water for an hour and gone over carefully with a soft brush, in order to remove any stuff that may not adhere properly to the glass. Finally, they are rinsed with fresh water and left to dry naturally.

SECOND FILM.

1. Gelatine, dissolved in 720 grammes of warm water	90	grammes.
2. Isinglass, boiled to solution in 360 grammes of water	45	„
3. Bichromates of potassium and ammonia, half of each salt, dissolved in 180 grammes of water	45	„

The three solutions, after being well filtered, are mixed together and heated to 42° R. previous to being poured over the dry plates already furnished with the first film. T. H. VOIGT.

—*Photographische Monatsblätter.*

(To be continued.)

AN IMPROVED MECHANICAL PRINTING PROCESS.*

IN making the exposure provide a mask of black paper having a large aperture of the exact size of the photograph. This mask is placed in the frame and adjusted above the back of the negative, the prepared glass being then superimposed. The two layers—that of the negative and that of the bichromated surface—are then in contact, and in order to have this contact perfect it is important that the glasses should be quite flat.

Notice that this process requires that the negatives shall have been reversed, otherwise in the finished print everything will be reversed, the left being to the right, and *vice versâ.*

Herr Albert adopts extensively the use of pellicular negatives which have been detached from the glass. Some have tried to obtain reversed negatives by exposing to the light through the glass; but a good way to do this is to make use of a mirror attached to the lens and placed vertically at an angle of 45° to the axis of the lens. This is much better than a prism, for large prisms absorb a great portion of the light and are very expensive. Care must be taken that the silvered surface of the mirror does not become deteriorated by the atmosphere and the gases in the dark room, and that the dimensions of the reflecting surface are not too small, or it will be difficult to work. The French opticians recommend a good mirror in preference to a prism of moderate quality. It does not matter much which way the negative is obtained, so long as it is done properly.

Concerning the exposure: the ordinary photographic printing-frame ought to answer the purpose well. Remóve, in the meantime, the springs and furnish the bars with some wedges of wood crossed; that which gives a pressure fit for the pellicular negatives will do. For an ordinary 18 × 24 photographic frame four wedges will suffice. Place the frame upon a black cloth, so as to prevent any light entering from beneath. Some operators prefer directing the negative towards the sun, alleging, as a reason for so doing, that a finer grain is obtained.

The Press.—The plate, having been freed from all the salt of the bichromate and dried, is placed flat under the special press used in photographic printing, with a sheet of white paper placed underneath, the better to judge of the effect of the ink. The Poirier press of recent construction is perfectly well understood in all minor details. Comparison is not to be made between this and that of Roderer, of Munich, the latter being a heavy machine imperfectly constructed owing to the mechanic's want of experience. Writers in the *Moniteur* have already remarked that the Poirier press is of moderate price; it answers the object proposed, and is all that can be desired. We would like to give a description of its construction, but a visit to a photographic *atelier* sufficiently convinces anyone of its efficiency.

It would be equally advantageous to procure the work of M. Knecht on *Lithography,* which treats on all the difficulties in the business. It is indispensable when one is professionally occupied with photolithography.

The glass being placed in the bed of the press, and the pressure properly regulated, moisten the printing surface with cold water by means of a soft sponge, using this for a minute for the first time; a period of from ten to fifteen seconds will suffice for subsequent operations. The superfluous moisture is removed first with one piece of linen and then with a fine dry piece. This being ready, a roller, designated "No. 1," is charged with a thick ink and applied. If the ink do not take hold strongly it must be cleaned off with varnish and applied anew. When there is too much ink the roller must be skilfully handled and the excess removed. When the image is sufficiently inked take a second roller, "No. 2" (very fine), to spread the coloured ink, which is composed of ordinary carmine and rouge; add, after a time, a little Prussian blue. This, however, is a matter of taste.

The effect of this colour is to warm the black, which otherwise would be too cold. It composes a tint which gives at once the required tone. The resources thus placed at the command of the printer are infinite, as every colour can be utilised.

For portraits and subjects a third roller is used for applying size. The ink used for printing is the best lithographic ink; a little lithographic varnish should be added.

There are three qualities of paper—the unglazed paper, the Saxe paper, and the enamelled paper. The selection of these is a matter of taste.

On a subsequent occasion I will devote a special article to the important subject of fatty ink. C^TE. LUDOVICO DE COURTEN.

* Concluded from page 375.

FOREIGN NOTES AND NEWS.

THE COLLODION FILM UNDER THE MICROSCOPE.—VIGNETTES WITH AN ORNAMENTAL BORDER.—VEGETABLE GELATINE.—HERR RICHTER ON DOUBLE SALTS IN THE COLLODION.—THE ACTINIC CORRECTION OF AN OBJECT-GLASS.

IN the *Archiv* Dr. Liesegang expresses his astonishment that the microscope has been so little employed in the investigation of photographic phenomena, especially as photography came to the aid of the microscope before almost any other branch of scientific research. That the microscope might be used with profit was shown by the researches published last year by Herren Rottier and Waldack on the deposits made on the negative by the developer, which took us on a stage towards the explanation of facts already observed by practical photographers, and he argues that success should encourage us to hope that by the microscopic observation of our sensitive films we might discover facts on which to build up improved processes.

These remarks were called forth by a series of microsopic enlargements of collodionised plates which Dr. Liesegang had just received from M. J. Girard, a French amateur. The photographs were accompanied by the following remarks, and further details were promised:—

"The microscopic examination of the collodion was undertaken in order to observe the changes in the condition of the film during the silvering and afterwards. A good collodion furnished, on the glass plate, a clear, colourless film. Collodion prepared from faulty cotton or with a watery solvent shows a reticulated, jointed structure. My enlargements are generally fifty times the size of the originals. Amongst them are:—A very old collodion, which is very fine, but acts slowly in consequence of the action of the decomposed ether on the cotton; collodion with too much alcohol, which furnishes a sort of cellular tissue. Too much water makes the cotton threads visible in the form of irregularly-shaped flakes. Too thick a collodion has an undulating, strongly-ridged appearance—the principal ridges running in the direction in which the collodion was poured off, and the side ridges running into each other in the transverse direction. One view shows a plate drawn too soon out of the silver bath; another the fully-silvered film. In the first there are the well-known oily stripes with wrinkled grooves and groups of crystals; in the latter a regular net is visible, with here and there clear patches, where there are particles of dust."

Dr. Liesegang says that the finish of the pictures is perfect, showing distinctly the formation of the fine ridges on the thick, and the frosty flowers on the too-strongly iodised, collodion.

In the same journal there is a letter from Herr J. G. Kramer, in which he describes an inexpensive way of preparing those ornamental vignette borders which were mentioned at a recent meeting of the Berlin Photographic Society as becoming popular in Paris as surroundings for ovals and vignettes. Instead of using the expensive so-called "Luckhardt vignettes," he takes a sort of marbled paper, procurable in great variety at any bookbinder's, and stretches it by making the wrong side of the paper very wet and laying it upon a wooden frame, the edge of which has been previously gummed or pasted. Another pattern is then stretched in the same way upon the other side of the frame. When dry all the creases are smoothed out, and the patterns are ready to be placed on the negative round which it is intended to copy the medallion border.

There is also an account of a sort of vegetable gelatine called "thao," which, if it could only be prepared in sufficient quantities and sold cheap enough, the *Archiv* thinks, should play an important part in the carbon and collotype processes as practised in hot countries, owing to the high temperature at which it dissolves. With potassic permanganate it is said to throw down no precipitate. Thao is found in the Alps, and is likewise imported from China. It is also prepared from *algae*, and at Rouen it has been got in the preparation of a sort of large-leaved tobacco. In the Malay language it is called "Ayar-ayar," and has been mentioned as such several times by M. Dietrich, of Java.

It may be interesting to compare Herr Richter's collodion formula with that given by Dr. Eder in his recent remarks upon double salts in the collodion. He says:—"For about four years back I have added mixtures of salts to my collodion which correspond pretty much to the double salts of Dr. Eder. These salts are so durable in the collodion that such a thing as the reddening of the collodion is for me but a memory, even when the temperature is at 25° R., and the collodion has been kept six months. When the light is powerful I mix—

Cadmic iodide $(5 \times 182{\cdot}7) = 913{\cdot}5$	....	5 parts.
Ammoniac iodide $(5 \times 145) = 725{\cdot}0$	....	5 ,,
Cadmic bromide............... $= 172{\cdot}0$	....	1 part.
Ammoniac bromide .... $= 98{\cdot}0$	....	1 ,,

In winter, when the light is weak, I subtract two and a-half proportions of the iodine salts and one proportion of the bromine salt. The latter appears, when weakly lighted, to be somewhat more sensitive. Mixtures of both are also very worthy of recommendation. These collodions can be used to the last drop without fear of their becoming thick. In summer I dissolve these salts in fifteen parts by weight of alcohol, and in winter in ten, and add to that three proportions of a two-per-cent. raw collodion. By transposing the point or multiplying the quantities by the same figure any desired quantity of the salt mixture can be got. Thus, if I wish to get about fifteen grammes of the salt mixture, then I multiply the sum of each quantity by eight, and put the point back three places towards the left, thus:—

$$
\begin{aligned}
913{\cdot}5 \times 8 &= 7308{\cdot}8 = 7{\cdot}30 \text{ Cd I}_2.\\
725{\cdot}0 \times 8 &= 5800{\cdot}0 = 5{\cdot}80 \text{ Am I.}\\
172{\cdot}0 \times 8 &= 1373{\cdot}6 = 1{\cdot}37 \text{ Cd Br}_2.\\
98{\cdot}0 \times 8 &= 784{\cdot}0 = 0{\cdot}78 \text{ Am Br}_2.\\
\hline
&\text{Total } 15{\cdot}25 \text{ grammes.}
\end{aligned}
$$

"Now compare my mixture with Eder's article, and it will be apparent that the salts—

$$
\begin{aligned}
&\text{D. No. 2.} = 2 \text{ Am I Cd I}_2\ 2\ \text{H}_2\text{O},\\
&\left\{\begin{aligned}&\text{A. No. 1.} = 2 \text{ Am Br } 2 \text{ Cd Br}_2\ \text{H}_2\text{O},\\ &\text{A. No. 2.} = 4 \text{ Am Br Cd Br}_2,\end{aligned}\right.
\end{aligned}
$$

are present. I did not take A No. 1 alone, because I have used the atomic weights according to the old theory, by which a double quantity of the Am. Br. is brought out, the formation of both salts standing as—

$$
\left.\begin{aligned}
\text{A. No. 1} &= 344 \text{ Cd Br}_2\\
&\ 98 \text{ Am Br}\\
\textit{plus}\quad \text{A. No. 2} &= 172 \text{ Cd Br}_2\\
&\ 196 \text{ Am Br}
\end{aligned}\right\} \text{is equal to } \left\{\begin{aligned}&516 \text{ Cd Br}_2\\ &294 \text{ Am Br}\end{aligned}\right.
$$

and these two numbers give three times the quantity of my bromine mixture $= \frac{172}{98}$. I did not fall upon these salts by chance, but as the result of numerous and varied researches by which the equivalent mixtures of the other iodising salts gave no satisfactory results. In future, also, it is my impression that Eder's salts D No. 2 and A No. 1 will come into general use. In conclusion: let me add, if the properties of the collodion be not already miscible, these salt mixtures can do it no harm, no free iodine being present."

Both photographers and astronomers are well aware that a telescopic object-glass which is perfectly corrected for visual purposes proves to be considerably over-corrected for the requirements of photography. For the latter it is necessary that the visual and actinic rays be brought together to the same focal point, so as to secure that quality known as "working at its visual focus." The over-correction of the object-glass of the telescope results in a separation of the chemical from the visual focus, and, consequently, a sharply-defined photograph cannot be obtained upon a sensitive plate situated in the plane of visible sharpness. Attempts have been made, by means of a supplementary lens, to effect the union of the actinic and visual rays so that an astronomical telescope might be used either for observing or for photographing the celestial bodies.

A few months ago a communication was made to the Academy of Sciences by M. Cornu, who had taken occasion to study the problem of the diversity of foci in connection with transit observations. As the result of numerous experiments he eventually demonstrated to the Council of the Paris Observatory the fact that by separating, to a greater or less extent, the crown from the flint glass which form the constituents of the achromatic object-glass, the chemical and actinic rays could be united at one common focal point without impairing the definition of an image obtained on a photographic plate. This idea of M. Cornu's has now been thoroughly tested, and the fact established that by a regulated separation of the elements of the object-glass an astronomical telescope may now be made to fulfil the double *rôle* of an instrument for either visual or photographic research. The separation of the lenses required is but slight, as it rarely exceeds one and a-half per cent. of the focal distance, which, however, is by this operation shortened to the extent of about one-fifteenth of its normal focus.

The large equatorial of the Paris Observatory—the object-glass of which is nearly fifteen inches in aperture and twenty-nine feet focus—has been subjected to this alteration, in virtue of which, by a simple arrangement, the glasses are separated to such an extent and with such precision as to be perfectly corrected for the actinic rays; and it has also been found that when thus temporarily altered it stills retains its property of giving good visual as well as actinic definition—a result which could scarcely have been anticipated. M. Cornu, at any rate, states that he easily observed Uranus and at least one of his satellites, without finding it necessary to re-establish optical achromatism.

It may be interesting to observe that the direct image of the sun or moon obtained by means of this equatorial, without the aid of the eyepiece, measures nearly three and a-half inches in diameter. It is expected that this discovery of M. Cornu will give an impetus to astronomical photography. It need scarcely be added that utmost care must be taken in adjusting the object-glass—a performance which will demand the services of a skilled optician.

Meetings of Societies.

PHOTOGRAPHIC SOCIETY OF FRANKFORT-ON-MAINE.

At a recent meeting of this Society an interesting discussion took place on the reason why negatives become denser as they grow older, in which several gentlemen took part.

Herr van Bosch said: The question is difficult to answer; but the darkening of the negative may be observed even in the first twenty-four hours after its being taken, being in this instance the opposite of the positive, which loses in intensity if exposed to light. It has also been observed that the negatives which have often been printed from are darker than less-used ones of the same age. It is also known that silver deposits on old plates is black, and in new negatives bluish or brownish.

Dr. Stein said: The microscope shows that the silver deposits on various sorts of plates are also various. In the darker negatives the molecules lie closer and thicker against one another; but that this closeness goes on becoming more close must be established by comparative examinations made from time to time with the microscope. Until now, as far as I know, this has not been the case, and when it has been done perhaps the cause may be discovered. Perhaps the subsequent darkening of the negative depends upon the action of latent light. The possibility of a latent action of light has now been recognised in various directions, especially by Moser's dew pictures, which are known to be based upon the fact that a flat body lying upon a smooth surface leaves in time a latent picture upon the flat surface, which, when breathed upon, becomes visible in the form of a dew picture. He (Dr. Stein) then reminded the members of Niépce de St. Victor and Becquerel's experiment, by which a sort of effect of light was obtained in the dark

from bodies long before exposed to the sun. They exposed the interior of a metal box to the sun, shut it, and a long time after they opened it in the dark. The action of the light obtained upon a sensitive plate was visible, the image of the edge of the box being formed upon the plate in the dark. Here a storing-up of the light had certainly taken place. But whether the after-darkening of the negative was to be explained as being due to the same cause as the foregoing must be determined by further research.

Herr VOIGT explained that the various colours of the deposits depended always upon the developer used. An iron developer always gave a grey deposit, and pyrogallic acid a bluish-black deposit; besides that, negatives taken some twelve years ago were more powerful than those taken nowadays—a fact that should be borne in mind in considering this question.

Herr GELDMACHER: It would be interesting and desirable if a preventive against this after-darkening could be discovered by investigating the matter more closely.

Dr. Stein then exhibited an improved sphygmograph, after which the meeting was adjourned.

Correspondence.

ON CERTAIN EXPERIENCES IN PRINTING.

To the EDITORS.

GENTLEMEN,—As you have been good enough to find room in last week's Journal for certain experiences of mine in the washed emulsion process, I venture to hope that you may be able to afford me space to ventilate other troublesome experiences in a very different direction.

Like, as I suppose, most other amateur photographers (using the word "amateur" in its true signification), I have always hated printing as, it is said, an individual unmentionable to ears polite "hates holy water!" I apprehend that the cause of this general feeling is that most of the exquisite beauty and delicacy of the negative is inevitably destroyed, or, at least, very seriously impaired, by the process of obtaining from it a positive *on paper;* for, of course, I do not refer to printing upon glass, either by the wet or dry processes, which yield results equal in beauty and perfection to the negatives from which they are taken. Except, however, in the case of stereoscopic transparencies and similar pictures, this method of printing is not generally applicable.

It is, no doubt, from this universal dislike to paper printing, as also from the fact that as a rule amateurs are unable to prepare their own albumenised paper, and are therefore relegated to the use of commercial papers of unknown composition, that, as I imagine, very few workers have experimented much upon the improvement of the process of printing, and those who, probably, have done so are professional photographers, who naturally keep their results to themselves. It is under such circumstances that I desire to bring my "experiences" and difficulties before your readers, not forgetting the Editors themselves, as I feel convinced that my troubles are those of a large majority of amateurs, and, therefore, if I can succeed in bringing about a combination and comparison of "experiences," much good may be the result.

To begin with, then, I may state that I have used various good commercial samples of albumenised paper, and have found very little difference in the results. I have always employed a rather strong silver bath for sensitising (say) a sixty-grain bath on the average, and have floated for a full time—say about three minutes. I have tried all sorts of toning baths; but I give the preference to the tungstate of soda bath, which in my hands never fails to afford me agreeable tones—its only drawback being that some *over*-printing is required, as this bath is viciously disposed to obliterate half-tone.

Now for my "experiences:"—In common, I should imagine, with all other workers, I sometimes come upon a negative from which I can *always* obtain a satisfactory print, so far, at least, as any paper print can thoroughly satisfy the aspirations of a negative worker. The production of such a *cliché*, however, is, in my hands at all events, I confess, rather a matter of chance than certainty. A little more or a little less development makes all the difference. It would appear to me that to obtain the best possible silver print on paper the negative must possess a certain amount of density to permit of the light acting on the albumenoid compounds *sufficiently* to enable the proof to stand the after-processes of toning and fixing without the obliteration of half-tone, and yet the middle tints of the negative must not be so dense as to prevent the actinic action of the light from passing freely through them. But this is just the difficulty. We all know the danger of pushing development too far, and we prefer rather to err on the side of *under*- than *over*-development.

But when one tries to print from a delicate, rather under-developed negative, full of beautiful half-tone, which is capable of being exquisitely rendered on glass, what is the result of printing upon paper? Again: I would very humbly remark, I am speaking more of my own experiences than those of others, though I know many who have met with the same difficulties. In my case, then, I have found that whether I print in the shade, under yellow glass, or opal glass, or by any other "dodge" known to me, even though by such means I succeed in producing a print which, when taken from the frame, appears satisfactory, I invariably find that after I have submitted it to the ordeal of the inevitable toning and fixing baths the previously-beautiful proof fades away into flatness and general worthlessness. No amount of over-printing *in the shade* appears to prevent this; the action of a *strong* light appears to be indispensably necessary to produce a sufficient decomposition of the albumenoid silver salts, and, in short, my experience is that if a negative will not stand printing in a strong light—sunshine best of all—it is impossible to obtain from it a thoroughly vigorous and satisfactory proof. Why it is that of two proofs, one from a perfectly developed negative *printed in strong light*, the other from a delicate negative *printed in the shade*—both, as taken from the frame, appearing to be satisfactorily printed—the first shall stand the action of the toning and fixing baths without injury to its half-tones and general vigour, while the second is completely spoiled it is no doubt very difficult to explain; but the fact is, unfortunately, certain, and it is of more practical importance to elicit how this difficulty can be got over than to determine its cause.

I believe the production of delicate negatives is now the practice generally, rather than those of a more robust character. If this be the fact there must be some mode of making satisfactory prints from such *clichés;* and I honestly confess it is my object in writing these "experiences" to find out how this can be accomplished, though I have sought to direct attention to the subject, not merely for my own information, but for the benefit of a very large number of brother amateurs, to whom such knowledge, if attainable, would be a great boon.—I am, yours, &c., W. H. F.

August 31, 1876.

REMOVAL OF HYPOSULPHITE OF SODA FROM PRINTS.

To the EDITORS.

GENTLEMEN,—By way of append to your article on this subject in last week's number I wish to remark that it is essential to procure a freshly-crystallised sample of acetate of lead. That which has a powdery look will not do at all. This salt decomposes rapidly when exposed to the air, but keeps perfectly in solution if the bottle be well corked. The acetate of lead should be dissolved some days before using. At first the solution is milky, but in three or four days becomes perfectly clear. Decant the clear portion and dilute as directed.

The enclosed print was made in August, 1871.—I am, yours, &c.,

Pendryl Hall, September 2, 1876. EDWARD VILES.

Miscellanea.

CITRIC ACID PAPER.—Messrs. E. and H. T. Anthony and Co. say:—"The paper prepared with nitrate of silver and citric acid for use in connection with the chromotype printing will not keep white very long in this hot and moist climate. We proposed to prepare it and keep it on hand for the use of the licensees of the Lambertype; but, finding that it is best to have it freshly prepared, we give the formula for it, viz.:—Silver, sixty grains; citric acid, two grains; water, one ounce. Float one minute."

OYSTER-SHELL MARKINGS.—A correspondent of *Anthony's Photographic Bulletin*, writing on this subject says:—"During this excessively hot weather I (and, I suppose, others likewise) have been very much troubled with a formation of 'mat silver,' or a thick, grey deposit, on the negative plate, taking a great variety of forms from a clam shell to all the fantasies of a frosted window; and, after trying all the remedies known to 'photo. medica,' the apparition refused to vanish. I have finally achieved success by simply dipping the plate, *after exposure*, in the bath for the space of one minute. This, I find, considerably shortens the exposure, while it materially adds vigour to the negatives. I should like very much to have your ideas as to the cause of this vexatious trouble. What do you think of my remedy?"

DR. VOGEL IN CALIFORNIA.—The photographers of the Pacific Coast gave a reception in July last to Dr. Hermann Vogel, of Berlin, their distinguished brother artist and scientist, at the rooms of Messrs. Bradley and Rulofson. A company of fifty or sixty assembled, including a few ladies. Mr. Jacob Shew presided, and on his left sat the honoured guest—a pleasant, good-humoured gentleman, not more than forty, with an open, hearty face, beaming with health, bright, ardent eyes, and a prodigious expanse of forehead. The Chairman, in welcoming Dr. Vogel in the name of the photographic profession of the Pacific Coast, addressed him in a speech profoundly expressive of respect and admiration at the great services he had rendered photography by his researches, experiments, and writings, these services having made his name among photographers "familiar as household words." Dr. Vogel, who was loudly applauded on rising to respond, confessed himself utterly astonished that he was there on the coast of the Pacific; but asking himself the reason for coming there the only answer was—photography. In his life he had studied a good many things, but generally not with much success. His father used to call him a lazy boy, and his mother used to say he was useful for nothing. For five

years he was assistant in a grocery. At the age of twelve he made a *camera obscura*, and also an electrical machine—crude apparatus, which he still possessed. When he made the camera he had little anticipation that it would be the chief instrument of his future. Dr. Vogel was declared an honorary member of the Society, and it was resolved to present him with cabinet portraits of all who attended the meeting. —*Daily Morning Call.*

A New Intensifier.—I send you (*Anthony's Photographic Bulletin*) a formula for reintensifying, which I think has never been published. As it is original with myself I will not be accused of sending you a merely copied article. I have used it for many years now, and never did it fail to do its duty. *For Line Work.*—Into a saturated solution of sulphate of copper pour a solution of bromide of potassium, enough to turn the colour of the negative to a white. This may be done either by pouring off and on several times or by leaving it in the dish till the colour changes; the stronger the bromide is in the solution the quicker will it change. When this stage is attained wash the plate, and pour on a solution of nitrate of silver. The film will now become denser and black. If not dense enough repeat the operations. It is rarely necessary to go further; but if any disappointment be experienced it is a sure sign of derangement of the bath—perhaps too weak, as it is, of course, absolutely required to have enough silver on the negative to take up the bromide. For portraits and similar work it is not required to carry the intensifying to the white stage—simply pouring on the solutions alternately and immediately washing the plate till the required intensity is obtained is enough. It may be that some may find it necessary to give still greater density, or from some cause the negative does not attain to the density it ought to, and no amount of repetitions adds anything to the density. Proceed as follows:—Wash the film with a weak solution of cyanide; then pour on a solution of iodide of potassium dissolved in alcohol, with the addition of iodine. The colour will change to yellow and be very dense. Such is the adaptability of this intensifier that almost any of the ordinary re-intensifiers may be used over it. In all cases it is of the utmost importance to commence with clean lines, and not to over-expose.—Wm. Campbell.

Uses of an Acid Collodion.—In an article on the *Negative Bath*, in the July number of The British Journal of Photography, the Editor makes allusion to the article by Mr. Dunwick, published in a recent number of the *Bulletin*, on the efficacy of a bath which, having been first treated with cyanide of potassium, was used for making pictures with a collodion to which acetic acid had been added. Apart from the use of cyanide of potassium in the bath, it is well known to the writer that acetic acid is a valuable adjunct to collodions. Our first experience of its value was acquired a long while ago, in the early days of photography. A friend having occasion to copy a painting in very hot weather could not succeed in getting any intensity; no matter how long or short the time of exposure, the picture came out about the same. Attributing the result to the excessive sensitiveness of the film as affected by the hot weather making the bath and the developer warm, it occurred to me that the only way to overcome this sensitiveness would be to have a slightly-acid collodion. The only acid that appeared feasible to use was the glacial acetic. Upon the addition of one drop of it to the ounce of collodion a perfect negative was produced at the first trial. I have recommended its use since that time, and recollect with pleasure a beautiful series of Hudson River stereos. taken with such collodion. Last summer one of our photographers, working in very hot weather taking views of public buildings, &c., in New York, was troubled with the same results, pictures flashing out immediately, and with utter lack of strength. Upon trying, at my recommendation, the acidified collodion the difficulties vanished at once, and the operator succeeded in getting some of the most delicate and beautifully-balanced negatives I ever saw. It was upon my suggestion, at a meeting of the American Institute Section, that Mr. Dunwick treated the collodion as specified by him, and with the results designated. What is a little remarkable is that the collodion thus acidified does not seem to change any more quickly than the ordinary. It will thus be seen that the testimony of all who have tried this "dodge" is in favour of it, and we think anyone (even the most conservative English photographer) would be fully warranted in resorting to its use should occasion require.—*Editor of Anthony's Photographic Bulletin.*

ANSWERS TO CORRESPONDENTS.

☞ *Correspondents should never write on both sides of the paper.*

J. C.—The label you propose will be quite sufficient.

Grope in the Dark.—Add a little more kaolin, and skake up well.

B. B.—Excluded for non-attention to the terms, frequently published, on which we answer correspondents.

Zero.—The Zentmayer lens described is not sold—certainly not generally sold—by the dealers in this country.

W. Hellawell.—We shall hand your letter to Mr. A. L. Henderson, who has had great experience with nitrate of barytes in the bath.

Subscriber.—The lens must have a focal length of not less than twenty inches, otherwise you will not obtain a picture of the dimensions required.

R. H. P.—The specification will cost fourpence, but it has not yet been published. It is probable that from four to six weeks will elapse ere it be printed.

Jas. Brown.—The lighting of all the pictures is excellent, but the prints have that peculiar appearance which furnish evidence of the thinness and over-exposure of the negatives.

Fritz.—Any landscape lens worked with its longest stop will answer for photographing clouds. No special kind of camera will be required, and either a wet or a dry process will answer.

Adelphia.—Do not waste your time in distilling the old collodion in the vain hope of the ether recovered acting quite as well as new ether, but keep it for cleaning plates, for which purpose it is well adapted.

X. Y. Z.—The article in question, when closely examined, will be found to be nothing but a trade advertisement. It is now about eight or nine years since it appeared, and we think that it still remains a unique example of its kind.

H. Hercus.—If the condensing lens be placed in a horizontal position, as drawn by you, it will be absolutely necessary to have a mirror mounted outside of the condenser, otherwise a beam of the sun's rays cannot be transmitted.

Amateur.—The view of the main street is defective in consequence of the camera having been placed too near to the middle of the street. Take another view, placing the camera close by the lamp-post in front of the saddler's shop on the left-hand side.

F. McGeorge.—The whole of the photographs described may be registered; but, while this is a fact that cannot be doubted, it will still remain an open question whether by such registration any protection is afforded. In your case we have a strong idea that there will not.

B. T. F. inquires—"What are the optical conditions under which one can secure an instantaneous portrait of a restless baby?"——In reply we say: A lens having a large aperture and short focus. This is the only lenticular condition requiring attention under the circumstances.

Jas. Lacy.—By the addition of glycerine to the glue or gelatine of which the cement is made it will lose its brittleness. We cannot here indicate the best proportions which should be adopted, but one or two trials will enable you to arrive at a satisfactory conclusion respecting this.

L. J. G.—Major Russell, several years ago, recommended the removal of the tannin from the sensitive surface by a copious application of water. The reasons alleged for this proceeding were the better quality of the picture and the greater sensitiveness which resulted from this washing.

J. Scott.—Try india-rubber finger-stalls. Although we do not ourselves use them, we can still imagine that there may arise numerous circumstances under which they might prove very useful to those who, like yourself, are apt to stain their fingers with splashes of pyrogallic acid and nitrate of silver.

Obliged Reader.—One of the most successful methods for causing silvered paper to retain its whiteness and sensitiveness for several days is to remove it from the silver bath upon which it has been sensitised and lay it, face down, upon another bath containing only distilled water. After a little time hang it up to dry, when it will keep white for one or two weeks. Expose it to the vapours of ammonia before or during its exposure to light in the printing-frame.

Received.—John Horsburgh; E. W. Dallas; Leon Vidal; H. G. C.

Photographs in Patent Specifications.—The following official notice has been issued:—Several photographs or sun pictures of inventions accompanying specifications having been left at the Patent Office instead of drawings, from which *facsimile* copies are required to be made to be used in evidence, this is to give notice that henceforth no such photographs or sun pictures will be received. *Facsimile* copies of photographs or sun pictures, according to the requirements of the patent acts, cannot be made in the Patent Office.

METEOROLOGICAL REPORT,

For the Week ending September 6, 1876.

Observations taken at 406, Strand, by J. H. Steward, Optician.

These Observations are Taken at 8 a.m.

August.	Bar.	Wind.	Wet Bulb.	Dry Bulb.	Max. Tem.	Min. Tem.	Remarks
31	29·18	W	48	51	62	47	Dull
Sept. 1	29·60	NW	53	57	69	50	Dull
2	29·80	NW	53	56	65	50	Dull
4	29·79	SW	57	59	68	55	Raining
5	29·65	W	60	65	71	58	Cloudy
6	29·53	W	62	63	—	59	Cloudy

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THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 854. Vol. XXIII.—SEPTEMBER 15, 1876.

ON DOUBLE FILMS.

In continuation of our experiments in connection with the density of the sensitive film and its effect upon the sensitiveness and quality of the plate, we have been led to try the use of double films—that is to say, films formed by coating the plates *twice* with collodion or emulsion. Doubtless most of our readers have at some time or other, either accidentally or intentionally, with a view to remedying some defect, employed a double-coated plate, and will be familiar with their general behaviour, which is scarcely different from an ordinary thick film.

In the course of our experiments, however, we have become impressed with the idea that there is a principle involved in the use of these double films which may be found of the greatest utility under special circumstances—not, be it understood, in the mere employment of a plate with a double layer of sensitive material, but in the judicious arrangement of the properties of the film employed. It will be easily imagined that, in re-coating a plate in the ordinary way with either collodion or emulsion, a certain amount of uncertainty of action and irregularity must ensue owing to the solvent action of the second coating; but in our experiments we have adopted means of obviating that difficulty, and have also availed ourselves of the use of different descriptions of films in combination upon the same plate.

In brief, our plan consists in using under certain conditions, in order to produce certain results, a film composed of two or more layers of the same or different sensitive materials, care being exercised to prevent the second coating from acting upon or dissolving the first. This is effected by drying the first film and covering it with a layer of gum or other protective substance before applying the second layer, by which means we secure all the advantages of an extremely thick film without the inconveniences attending its preparation and use under ordinary circumstances.

But it may be asked, why use two films, when one is sufficient? In reply we can only say that we do not offer this as a new method of working, but simply as a convenient and ready means of producing a film of extraordinary density in cases when that quality is likely to be of value, or as an occasional resource or dodge for use under peculiar circumstances. In addition to this, by a judicious combination of the properties of different classes of films results may be secured which would be almost impossible of attainment with a *single* film of the ordinary description.

Our complaint against emulsions has been that, owing to the film being homogeneous throughout its thickness, it is impossible to secure in the one result both rapidity and vigour, while a bath plate, from its containing in its pores a certain quantity of unconverted haloids, while the surface has been acted upon to the fullest extent by the silver solution, is capable of producing the most vigorous results with very brief exposures. By employing as the preliminary film an emulsion containing excess of bromide, and as the second one of the more rapid though less vigorous methods, we have made the nearest approach to a solution of the question of rapidity and density combined. We need not further enlarge upon the various applications of the principle, for our readers will be able better to adapt the method to their special requirements than we are to explain it within the limits of an article of this sort; we shall therefore pass on to a description of the method we have employed.

As it is necessary to wash the collodion film previous to applying the intermediate protective layer, it will be found equally convenient to employ for the first layer either a bath plate or one prepared by the old collodio-bromide process, there being no gain in the use of a washed emulsion. We have succeeded the best with a rather insensitive emulsion, containing about a grain and a-half excess of soluble bromide. If the plate be sensitised in the bath it will be well to flood it with a weak bromide solution, in order to remove all free silver, or to withdraw it from the bath before being fully sensitised, the object in either case being to leave a slight trace of unconverted bromide in the film.

The plate is then treated in the ordinary way with a "preservative," which should consist of some substance capable of forming a varnish upon the film insoluble in alcohol and ether. For this purpose we have used gum arabic, albumen, and gelatine, giving the preference in the order they are mentioned. Gum appears to interfere less with the general qualities of the plate than do the others, but it is liable to the charge of producing blisters between the two films during development. Albumen, on the other hand, tends to harden and consolidate the film, but appears to interfere to a slight extent with the action of the developer. The gum should be of the strength of about fifteen grains to the ounce, and must be most carefully filtered and kept free from floating particles, or all chance of an even film will disappear.

After thoroughly drying the preservative coating, preferably by heat, the second film is applied. At this stage we use a highly-sensitive emulsion made by a formula which refuses to work with sufficient vigour when used alone, but in this method the vigour is supplied by the under film without apparently interfering with the sensitiveness of the other. The behaviour of a plate prepared in this manner is most characteristic. The first application of the feeble alkaline developer produces a faint image scarcely distinguishable from the rest of the film, but as the solution acquires sufficient strength to penetrate into the film the density grows rapidly. With a moderately-thick film prepared in this manner most charming half-tones are obtainable, and there appears to be no tendency to "blurring." The developing should be performed with alkaline pyro., as, for reasons we need not here repeat, the thickness of the film makes but little difference when silver development is employed.

ON THE DETECTION OF FAULTS IN LENSES.

It not unfrequently happens that photographic lenses which give excellent definition as a whole sometimes fail to do so on certain portions of the plate. For example: we were at a former period well acquainted with a portrait lens of five inches diameter which, when worked with a small diaphragm, produced most charming groups, but it invariably occurred that no figure situated on the right of the central figure could by any means be obtained with the facial lineaments well defined. The lens was eventually returned to the dealer from whom it had been procured, and by whom it had been submitted to us for examination. By a simple method, well

known to those in the habit of examining lenses, we discovered in the flint element of the back combination a circular "whirligig," striated defect, the diameter of a pea, at one side of the lens. This example of striæ could not be discovered by examining the lens in the usual way; it was only by taking it into a dark room and testing it by the flame of a candle that the defect could be discovered. The front lens, which was suspected to be the source of error, was very perfect, but the defect alluded to vitiated as much of the image as it intercepted.

Among the papers read at the meeting of the British Association just closed will be found a short communication on this subject by Mr. Howard Grubb, M.C.E., in which he describes the method by which flaws are detected by the optician. His remarks, however, have special reference to the subject from the practical optician's point of view.

We here supplement Mr. Grubb's observations by a few remarks indicating in what manner photographers may, without any troublesome process, subject their lenses to such examination as will enable them to discover the slightest wave of unequal density in the glass.

Having brought the lens into a room lighted simply by a candle or a small jet of gas, hold it up at the distance of ten or twelve inches from the eye, and pointed in the direction of the flame of the gas, which latter should be at a distance of some yards from the observer. It will be better if the elbow of the arm which supports the lens should rest on a table. If the lens be pointed straight towards the source of illumination it will present the appearance of a circular blaze of light. Now move the lens a little—first to one side, and then to the other—doing this very slowly. This will cause the image of the flame to pass away to one side of the area of the lens, the bright edge of the flame standing in brilliant contrast with the dark portion. Examine the junction between the light and the darkness, and if there be any internal defects in the glass they will be recognised by the light, more or less faint, refracted from the spot, the latter being of unequal density, whether the defect assume the form of a spiral, a tear, or an elongated marking. By proceeding in the manner directed we have frequently discovered defects of extreme minuteness, which, although not interfering with the performance of the lens, yet demand that it be relegated to a class of instrument lower than that to which it was first stated to belong.

A high-class optician will not knowingly make a lens of a disc of glass possessing defects of the kind indicated; still, we cannot imagine that an optician exists in whose lenses are not sometimes found these organic defects. They are most commonly to be met with in objectives of large dimensions, and an inexperienced observer will more readily discover their presence in a portrait or other similar form of combination than in a single achromatic landscape lens.

The *cui bono* of such a discovery, when made, is as follows:—In the majority of instances in which they are at present found their *locale* is usually situated nearer to the margin than to the centre of the lens. Now, every photographer knows that in a large portion of each picture taken the defining qualities of a lens are not called into requisition. In a landscape such portion is the sky, but in a portrait it is the space over and at each side of the sitter. Now, if striæ be present in a lens to such an extent as to entirely obliterate all detail on a certain portion of the picture, a radical or, at any rate, a practical cure may be effected by the rotation of the defective lens in its cell to such an extent as to bring the offending spot in a line between some part of the scene or subject in which definition is not required—the sky, for example—and the sensitive plate. If the striated defect is adjusted so as to be at the top of the lens when screwed into the camera it will do comparatively little harm.

While on this subject we may observe that, owing to carelessness or accident, valuable lenses are sometimes seriously chipped at the margin; and it may interest the possessors of such lenses to know that by painting over the fractured portion with opaque black varnish, and rotating the cell containing the lens until the defect shall be turned out of harm's way or into what we may designate an inert position, a chip or marginal fracture will not appreciably interfere with its utility as a portrait combination.

THE PHOTOGRAPHIC EXHIBITION.

[First Notice.]

The *soirée* by which the opening of the Exhibition of the Photographic Society of Great Britain is annually heralded took place on Friday evening last, the 8th instant. The attendance was unusually large, and it was especially gratifying to notice that the proceedings were graced by the presence of a greater number of the fair sex than we have seen on any previous occasion.

A more than ordinary amount of misgiving was very widely spread as to the success of the present Exhibition. The very early date fixed for the opening, September being, as a whole, one of the most favourable months for outdoor work; the emptiness of town; the fact that the meeting of the British Association was taking place at Glasgow at the same time, causing the absence of the President and other officials of the Society—all conspired to create dubiety. One glance, however, round the well-filled and brilliantly-lighted room was sufficient to dissipate all fears, for it showed that the walls were well covered with a collection of highly-attractive pictures.

Kindly greetings over—for, in the absence of Mr. J. Glaisher, the pleasing duty of welcoming the members and their friends devolved upon the Vice-President, Mr. J. Spiller—a closer scrutiny of the pictures revealed the fact that, although so attractive as a whole, there was not an example of fresh discovery or even novelty among them; no new process either for enlargements, negatives, or prints; no indications of fresh applications of photography; and no microscopic enlargements, or other examples of the art as applied to philosophic uses. Combination printing has only one representative, while (with the exception of a few small pictures by Mr. R. M. Gordon, and some grand specimens of collodio-albumen by Mr. W. D. Sanderson) of dry-plate work there is next to none. This is the more surprising in view of the attention bestowed upon the subject during the past year, and we confess we were greatly disappointed at not seeing more indications of successful working with washed emulsion, the only exhibitors being Mr. W. B. Woodbury and Mr. W. F. Henry. Gelatine emulsion, too, appears to have only one disciple, who contributes a small print from a negative taken on one of Kennett's plates.

Mr. Crawshay, of Cyfarthfa, has contributed no fewer than twenty-five pictures, while Colonel Stuart Wortley has several characteristic views of clouds and water. Messrs. Bedford, Fry, Faulkner, Nesbit, Gordon, York, and other well-known exhibitors send in contributions worthy of their reputation.

Of portraiture there is a much larger show than usual, detailed criticism upon which we reserve for succeeding articles, contenting ourselves merely by stating that there are numerous specimens of the utmost excellence, both technical and artistic. A large portrait of Mrs. Bravo, by Lombardi, naturally arrested the attention of every visitor.

Of large direct heads there is only one exhibitor—Mr. R. Slingsby—who sends a portrait of Mr. G. H. Shipley.

Captain Abney, the Royal Engineers, the Autotype Company, and the Woodburytype Printing Company have an imposing array of enlargements, both portrait and landscape.

Mrs. S. G. Payne's studies of flowers—and particularly her design for a lady's fan—should on no account be overlooked. On the table are lantern transparencies by Mr. F. York, a retouching desk, devised and exhibited by Messrs. Burrows and Colton, a camera by Mr. George Hare, a case of photographic apparatus by Messrs. W. Oakley and Co., and a revolving stereoscope containing Indian views, by Mr. J. Beasley, Jun.

We greatly regret to notice a serious falling off in the number of exhibitors. There are only seventy as against eighty-nine last year; and while this year 346 photographs have been hung, last year the number reached 417. This may be partly due to the early date of opening; but we hope next year to be able to see work by new hands, and also become re-acquainted with the productions of many well-known amateur and professional photographers whose names we miss sadly from the catalogue.

The manner in which the hanging committee has executed its difficult and delicate task will elicit general approval, and we trust

that the Society will be fortunate enough to secure a financially successful Exhibition.

In accordance with our annual custom, we shall next week commence a series of critical and descriptive articles on the exhibits forwarded.

The question of non-actinic windows for the operating room has once more been raised by Dr. van Monckhoven, who has discovered that by using green glass in conjunction with the ordinary orange a white light is produced which has no actinic effect upon the most sensitive film, and is, at the same time, much more comfortable to work by. There are few photographers who have not at some time or other experienced the discomfort and inconvenience of the common mode of lighting—not only as regards the irritating effect it has upon the eyesight, but also on account of the extremely small quantity of light rays which are transmitted by a really non-actinic sample of glass, and Dr. Monckhoven's discovery must have raised hopes of an improved state of affairs in the minds of many. The statement that the combination of orange and green glass transmits a white light is, on the face of it, rather startling, and we at once put ourselves in the way of testing its truth. Having procured three or four samples of green glass of various shades, we proceeded to test them in connection with the glass we employ in our own dark room, which is of two colours—ruby, when daylight is the illuminating source, and deep orange when artificial light is used. After repeated trials under a variety of conditions we are unable, however, to record an opinion coinciding with Dr. Monckhoven's—that is to say, we have entirely failed in producing anything approaching to a *white* light, which, to tell the truth, is little more than we had expected. The result of the employment of a rather light tint of green in conjunction with the orange glass certainly gives a soft "cool" light, very much pleasanter to the eyes in working, but deficient in power in arresting the actinic rays; if by substituting ruby for the orange, or using a darker shade of green, the non-actinic character of the "light" be increased, its illuminating powers are so much impaired as to render it even more unpleasant than the old form. It has been demonstrated long since that green glass is quite unsuited for employment with highly-bromised plates, and it is therefore evident that it is not to be used as a partial substitute for non-actinic ruby, for whatever active rays may be transmitted by the lighter shades of ruby and orange will also pass through the green. Its only use, then, is in conjunction with an already sufficiently non-actinic glass, to alter the colour of the light, and the question which has to be decided is—"Can this be done without interfering with its illuminating power?" So far our experiments lead to a negative, but we cannot yet consider them conclusive.

TRANSPARENT MARKINGS IN NEGATIVES.

I am induced by a reference in your leading article on spots in the emulsion film in your last number to address you on the subject of my experience with these blemishes.

I first made their acquaintance on a film prepared with an emulsion not made by myself. The quality of the image on development was so excellent that I proceeded to filter and again tried some plates, which presented the same objectionable features, viz., scarcely visible specks surrounded by perfectly transparent and sharply defined discs on those portions of the plate which should have been darkened by the developer. On treating the image with nitric acid the picture disappeared, and after exposure to light the remaining bromide of silver was washed with weak ammonia; this time the silver was found to be reduced by the alkaline developer in the whole series of round holes which had resisted development on the first application.

This was a result so inexplicable to me that I resolved to undertake the preparation of washed emulsion. I own to some chagrin when I discovered that films prepared by my first efforts showed defects similar to those already referred to. In this experience I have not been alone, and some explanations had been propounded as to the spots being caused by hypo. dust. I have not so produced them by actual trial, but I doubt very much if it would cause the same appearances. I do know, however, that since I adopted the method described in the article you have done me the honour to quote from, I have been constantly preparing both emulsions and dry plates from them, in presence of all the influences supposed to be injurious, and yet the negatives, of which I have made a large number, do not show any disposition to suffer from the malady which formerly attacked them, and which was nearly discouraging me from pursuing this line of practice.

The round spot, which may be said to be peculiar to the washed emulsion film, is not confined to the transparent form, for I found on one occasion, after adding some tannin to a finished emulsion, that the plates bore a few black spots only, also perfectly circular, and visible both previous to and after exposure. This special feature is, I think, more easily accounted for by the fact that tannin has a reducing action, and coming in contact with a body of emulsion some particles may create, even in the absence of the power of light, a reduction of the silver bromide, but why they should not take a somewhat irregular shape I do not pretend to explain.

There is also the black and the white comet. The latter you have dwelt upon, and the former, which results generally from imperfect filtration, is happily to be avoided by the perfect redissolving and treatment of the emulsion by using the best cotton-wool to pass it through from the stock to the coating bottle.

These are, however, but mechanical matters, and I wish to refer to yet another item which has more of a chemical aspect. A quantity of emulsion, prepared by allowing the action of an organifier on the pellicle, was used to make some plates which were kept some months before being exposed. They were stored in the same box with some Liverpool emulsion plates. The latter proved quite good, although not quite so sensitive as those freshly prepared, whilst the others were covered with small white dots with minute, soft halos—not clear-cut like those which are found in a newly-prepared faulty emulsion. These hazy spots are clearly chemical imperfections, resulting probably from the decomposition of the small portion of organic matter which may remain after washing. That some effect is produced by such an application is evident by the invariable discolouration of the pieces of pellicle, which is not removed by soaking in water; and, from my own experiments and those of others engaged in the making and use of emulsions, I have been led to abandon the use of organifiers in any form as tending to injury, relying upon the species of bromide used in the preparation which are found to furnish the power of obtaining all the qualities necessary to perfect work.

John Nesbit.

CONCERNING SLOPPY PHOTOGRAPHERS.

I am afraid it is of no use to appeal to the consciences or feelings of the brethren who are in the habit of slopping their chemicals about wherever they may happen to be. I suppose there must be many such, for it can hardly be one or two individuals only who visit all the cathedrals, ruins, and show-places, leaving behind them awful traces of their presence. This is a matter which concerns all cleanly-working landscape (as distinguished from portrait) photographers, amongst whom I flatter myself I may be reckoned. There is a growing prejudice against the fraternity in such places, and none who behold the frightful messes which these sloppers sometimes succeed in perpetrating can wonder at it. No place is sacred from their defilement. The corner in which the tent has been erected is, of course, the worst. If this were all it would, perhaps, be no great matter, as an out-of-the-way place is usually selected for the deeds of darkness connected with preparing and developing the plates. In many places, indeed, a special corner is pointed out to the photographer, where he may erect his tent and "mess about" to his heart's content.

It is not this that I complain of so much as the habit some people have of carrying their dark slides about, and therefrom dropping a trail of silver stains wherever they may happen to convey them. It is safe to say that there is not one of our cathedrals that has not numerous spots of silver on every part of the floor where cameras are usually posted. I write feelingly on the subject, as, in consequence of the filthy habits of some of my predecessors, I have several times had difficulty in getting permission to take photographs. Indeed, the description which one cathedral verger gave of his Dean's tantrums, when he saw what had been done on the steps of the altar, was such that I really wonder I was not shown the door at once. I could not help feeling a sincere desire—which will be shared in by every properly-constituted mind—that that Dean, wearing his stoutest boots, could just have got a tight grip of that dirty photographer's collar, and unto him, with said boots, have administered an earnest remonstrance on the subject of cleanliness.

It would really seem as if many of us were totally unconscious of the existence of such a thing as blotting-paper. The price can hardly be the objection to its use, and if the bits are saved—not at all a difficult thing when once the habit has been acquired—and added to the residues it may be made to pay its cost several times over, and in these days of competition and low prices these small economies are not to be despised.

I have alluded to but one little item of uncleanly habits. Everyone who has had much to do with photographers must be aware how they are often carried into every detail of the business. Who has not seen many of them horrible to see and to smell? Pray, Messrs. Editors, give them a "jobation" occasionally. RUSSELL SEDGFIELD.

NUCLEI IN PHOTOGRAPHIC FILMS.

IN your last number is an article on *Transparent Spots in Negatives: In Search of a Nucleus*, wherein is clearly described the fatal influence of these places on negatives, effecting, indeed, complete ruin upon work otherwise well planned and carried out, with total loss of valuable time and opportunity. Having seen several examples of these spots I have followed your clear description, and venture to throw out some hints to those who have the interest to study and avoid these evil "plague spots" resulting from photographic emulsion working.

It is sought to find a cause—a nucleus—for this disturbing influence. If a crystalline centre could always be found, then some favourable imperfection of the glass might have determined that crystalline deposit, and strange changes might result from that centre; but the liquid itself may hold some foreign body, or perhaps both plate and liquid may unite in affording conditions at some places and not at others for these strange transparent spaces.

As the microscope and the application of polarised light have failed with all other tests to find a nucleus upon the glass to account for these spaces, and you hint that there may be some disturbing element —some fluid, in fact—that may mix and yet may separate from the solvents of the collodion, let me call attention to a group of facts and analogies to guide observations.

If a chemist has to account for the differences in two samples of water—the one clear and the other turbid—no analysis in the world will afford him insight into the nature of any body and the force used to stir up the deposits that sully the otherwise clear water, so we may have active causes to show great effects, and requiring roundabout evidence to show the time and place of the disturbing force. Chemistry affords many cases to guide us by analogy. We know that a barometer tube or a gauge glass belonging to steam boilers may be in constant use for years; but when we try to cleanse the inside of these tubes, or drop a piece of wire down them, and lay them aside, yet, although no scratch or flaw be visible, the tubes have received a fatal influence. Sometimes the tube breaks immediately, frequently after being laid down carefully; after a night's rest it may be found cracked and broken with a strange travelling fracture quite through the solid, round and round the glass, sometimes darting down longitudinally and again finishing off in circles round the tube. Practical men, to their cost, know of this strange property. No microscope has yet been of any use to show the least change of surface; here, then, is very great residential *mechanical* force of destruction from very slight impact or friction of a foreign body.

Let us now take *chemical* solutions and surfaces. Few persons can have worked with glass and solutions without having observed traces, lines, and irregular patches on the glass vessels when test fluids are within. Years since, when the writer was assisting the late Professor Daniel investigating waters and the influence of light upon waters with nitrate of silver added, it was quite common to find these stains and lines, and we had to make allowance for them. New glass could not be taken, for the surface would be covered with *dust*, and this, crushed down with a duster, gave lines and smeary patches, evidently showing the texture of the linen, and giving evidence of the force applied. Of course a cloth washed with soap was not chemically clean, and, if clean and held in the hand or laid away, would be liable to carry impurity.

Apart from these, a well-known case occurs when the great sagacity of the late Dr. Wollaston was enabled to employ these very evanescent nuclei to a most useful purpose—even as a test agent for magnesia. The triple salt of magnesia, phosphoric acid, and ammonia is readily formed and is difficultly soluble. When these are mixed together a cloudy precipitate will ultimately fall; but if the solution of magnesia be dilute, then, if the surface of the glass vessel be rubbed (not scratched) with a hard body—say a glass rod—the ammonia-magnesian-phosphate falls quickly, and by preference where the glass stirrer has rubbed the containing vessel. Dr. Wollaston investigated this action, but he could not find any better test of this mechanical friction than by this deposit. So true is this, that lines and names and figures rapidly overrun by the point of the glass stirrer will, after a little time, appear quite legible and white, and the rest of the surface scarcely affected. This test is admitted by chemists, but it is adverted to as a case where, by mechanical force, there is a resident power for some time quite sufficient to determine the separation of bodies from their solvents.

Of course there has been the usual terms of "friction," "electricity," &c, applied to this state of affairs, but I name it to show that the nuclei may be a residence of a force, mechanical or otherwise, exercised, which remains for a certain *time*, and capable of determining the balance of affinities.

I have thought, too, that the emulsion might contain other bodies than the alcohol and ether. In the formation of these substances it is well known that each may contain some of the other. Thus alcohol may contain ether, and both may contain water; but besides these are the well-known substances called the heavy or the light oil of wine. If, in addition to these, we have the wood spirit, then the methylated alcohol and methylated ether may contain some of these foreign substances like the sweet oil of wine, the very property of which of forming minute spheres and drops has been noted, especially when acted upon by water.

While showing the probability of some of these bodies being present, I will call attention to the "Hoffman's fluid" presently.

But, besides the alcohol and ether, is no other substance present? is not water present in washed ether? Thus, washed ether retains one-tenth of water. Liebig says that thirty-three parts of pure ether retain one of water. But there is no reason to suppose expensive processes are employed to obtain pure ether, as, during these changes and mixtures, the ether is a solvent for many fixed and volatile oils and alkaloids. By the action of potassium or sodium by contact with ether, potassa and soda are formed and hydrogen disengaged. Now here is just the chance for the changes in the bromide of potassium, &c., to play such part. Here, too, it may be useful to call attention to the fact that it may be well to consider the deportment of the haloid salts; the bromides of potassium and of silver are considered as anhydrous salts, *but all such anhydrous haloid salts combine with alcohol* and *form crystallisable compounds*. Here, then, are the very conditions in the photographic film to have a determining action by a favourable nucleus which may have been a force, or may be the separation of a body like etherole, partially miscible or partially separable, as rest or agitation may prevail.

I have spoken of the possibility, the probability, nay, the almost practical certainty, of foreign bodies being present in essential oils derived from alcohol, ether, methyl, and their solvent powers; but what are we to say to the following from Brande and Taylor:—"A mixture of alcohol, ether, and *etherial oil* is known under the name of 'Hoffman's anodyne liquor,' or 'spirit of ether,' and such a mixture is used in photography as a solvent for pyroxyline." Here we have the very class of bodies *purposely* introduced, and, taken with the facts of haloid salts anhydrous to water uniting with alcohol to form crystallisable compounds, we have the elements to be influenced by mechanical and chemical nuclei, and I think it hopeful for good observers to follow out these hints.

Permit me before I conclude to call attention to some other practical points. A short time since a process was deemed imperfect, for the results were variable. However, by shaking up the fluid in a *larger bottle* all matters worked well, and so the photographer very properly published the fact. But what are the forces that conduced to success? Is it chemical affinity or mechanical surfaces, or forces to give heat by friction, or electrical action with *time?*

But my especial point now is respectfully but firmly to ask photographers generally what they mean when they so constantly are introducing a new element into reasoning—a force to which they assign no properties or bounds beyond what they choose to specify. I mean the influence of *time*. It is clear to me that in photography—in practice at least—besides mechanical forces and mechanical affinities, the influence of *time* is named as effecting desired changes or stability. In the practice of photography chemical equivalents and all recognised chemical laws are constantly set aside, and *time*, &c., substituted.

Some writers speak about the "ripening" of collodion; but, when difficulties are to be obviated and practice explained and simplified, it is clear that the parties who constantly ignore the whole action of chemical equivalents, and freely use the words "ripe" and "time," may expect that anomalies may be without explanation, and "plague

spots" and blemishes may be doubtfully traced to the favouring nuclei.

What has been said is with the sincere desire that those who are so situated as to make observations should be vigilant to trace if they cannot avoid some of these unexpected evils which entail doubt and ruin in the very course of what was expected to be success, and be as clear in their language as possible.

T. J. Pearsall, F.C.S.

CHEMICAL MANIPULATION.

Much difference of opinion prevails as to whether the collodion should be kept some little time after iodising or not, some preferring to use it almost immediately after iodising, and obtaining the colour of an older collodion by the addition of alcholic tincture of iodine. A collodion so prepared, however, requires very careful treatment, being so very fugitive; for, if an excess of iodine be used a bluish image is the result, yet, anomalous as it may appear, one which will require to be kept (visually) very thin in order to obtain sufficient half-tone in printing, or, if intensified to what would appear the usual opacity (were a pretty ripe collodion used), very harsh contrast will result.

A kept collodion, however, is always under control, and the results are to be relied on, being bold and well-defined, while with a newer one a great lack of vigour is often perceptible. It is very necessary to keep the collodion both cool and as dark as possible, otherwise ozone is liberated very rapidly, causing a decrease in the sensitiveness, and thus necessitating longer exposure.

Both in the preparation and use of the nitrate bath great cleanliness is indispensable. Rain or distilled water and recrystallised nitrate of silver are to be preferred, the usual proportion being thirty-five grains of silver salt to the ounce of water. After the crystals are dissolved the solution should be exposed to daylight for a few hours and then filtered, after which it is to be saturated with iodide, either by addition of iodide of potassium at the rate of one and a-quarter grain to every ounce of nitrate used, or by coating a plate and immersing in the usual way, and leaving in the bath over night. To acidify, one drop of pure nitrate acid to every four ounces of solution will be *quant. suff.*

Rain water, being often contaminated with organic matter, it is a safe plan to measure a quantity and add a few ounces of an old bath, and sun for a few days prior to using it, after which filter. Rain water so treated is often preferable to distilled water, which is very often contaminated with materials which have been distilled in the same retort. Water so contaminated and used for the preparation of a silver bath will almost invariably cause fogging, and will prove a source of many other failures.

The number of developers being legion, it is hardly requisite that the formula of any be given. However, the following are subjoined, which have proved very satisfactory and reliable:—

No. 1.

Sulphate of iron and ammonia	$2\frac{1}{4}$ ounces.
Acetic acid	$2\frac{1}{4}$ fluid ounces.
Sugar	$2\frac{1}{4}$ ounces.
Alcohol	*quant. suff.*
Water	48 ounces.

No. 2.

Sulphate of iron and ammonia	3 ounces.
" copper	$1\frac{1}{2}$ ounce.
Gelatine	$\frac{1}{4}$ "
Acetic acid	3 fluid ounces.
Alcohol	*quant. suff.*
Water	80 ounces.

The cause why so many fail to attain really good negatives is attributable, in a very great measure, to the mode of developing and subsequent redeveloping. Results that are inevitable—or, at least, partially so—from the condition of the light or chemicals may be greatly modified. Assuming that a bath be inclined to yield a weak image, the utmost intensity possible may be obtained by pouring on just sufficient developer to cover nicely, and keeping it gently moving until fully developed without further addition of developer. If more intensity still be required a few drops of silver may be added very cautiously, or harshness will result. If, however, on the other hand, harsh contrast be obtained, the plate should be kept well flooded by frequent additions of developer; this will reduce the intensity considerably.

When a bath has been used considerably it is very liable to become saturated with alcohol from the collodion, which causes oily streaks across the plate. These may be entirely obviated by draining the plate well on a blotting-pad, and so placing it in the holder that the *thick* end of the collodion is at the top. A bath in such a condition is best rectified, as the image resulting often lacks roundness and vigour. A few ounces of distilled water should be added to precipitate the iodide, and afterwards a little carbonate of soda, in solution, added to neutralise, sunned, filtered, and strengthened.

Streaks and unequal development is often caused by draining the developer off the plate before it is completely developed, and holding up to the light for examination. It is preferable to have the light below the plate, so that the progress may be viewed by transmitted light. Again: streaks are caused by tilting the plate rapidly backwards and forwards, instead of keeping it in a gentle rocking motion.

A harsh, blue negative after redevelopment may be caused either by the use of too much silver with the pyro. or too much citric acid in the pyro. solution. If the action has not gone too far it may be considerably reduced by treating with strong cyanide solution. Z.

ON THINGS IN GENERAL.

One must be allowed a little indulgence for any unusually erratic tendency in one's ramblings during this week of scientific excitement, when all the world is at Glasgow; for, what with meetings of sections, lectures, and excursions there is little time for writing, and, indeed, on no occasion does the quill stand such little chance of getting its due share of attention. Everybody who can make the slightest excuse runs off to Glasgow, and of a truth it does form a very capital meeting-place for all friends who can in any way connect themselves with science, whether in imagination or reality. Science in this style is a fashion, and the worthy writers of papers must have a hard battle in their endeavour to duly mingle deep science and elementary instruction in a manner to suit the very mixed assortment of intellects that throng around them, for I am sure I am within the mark in saying that ninety-nine out of every hundred of visitors know as much about science as science knows of them. As to photographers—well, the less said about them the better. They have made a very insignificant appearance for some time past on these occasions.

It will, however—and time it did!—swamp the great Balham mystery, and provide a new pabulum for the wonder-mongers who fly to the *Daily Gusher* to air their amateur science and law. I believe every possible hypothesis in the case but one has been therein suggested, and that most valuable one I here propound, and wish for no reward save that my name be linked with it in the roll of fame. The deceased gentleman, it was proved, was fond of science and studied poisons. What a fascination, then, must the New Method of Photography, the great antimony process, have had for him! He must have been practising it at some friend's, and daily absorbed enough into his system to produce fatal results. This would explain everything in this mystery. *Verb. sap.*

What a nice topic—that of photographic poisons—I have wandered into! A great deal of virtuous indignation has recently been roused at the ease with which the deadly cyanide can be obtained, as if anyone determined to commit suicide could find much difficulty in getting a poison of some kind sufficient for the purpose. A man who, as recently happened, could grind a lump of cyanide into powder with his teeth, and then swallow it, would not be deterred by a trifle, as anyone who has ever tasted the nauseous, bitter stuff can imagine. Rather a triumph of science was his rescue though! The man lost consciousness directly. He was taken to the hospital and his inside well pumped out; then symptoms of suffocation set in through a thick accumulation of mucus in his throat. In a moment the surgeon whips out his instrument, cuts a hole in his windpipe to give him a fresh breathing-place, and then for two mortal hours treats his chest like a pair of bellows and makes his lungs work in spite of himself. The man recovered, and in four days was almost as well as ever. Hear what the sapient editor of "the largest circulation" says about the deadly properties of cyanide:—"Strychnine, deadly as it is, is yet a drug which, as compared with cyanide of potassium, is, if we may say so, inert." We learn much that is new and much that is true in those pages. This statement is new, but not true; but none less need we be careful in the use of this deadly chemical. I cannot get these poisons out of my mind. A new poisonous agent, namely, poppy-head tea, was suggested the other day as a dry-plate preservative. Would its action be any different from that of morphia, relegated to the limbo of useless processes years ago? Its use was also suggested in the developer, but that also fell flat upon inappreciative photographers.

I was exceedingly amused to read a letter, a week or two since, in these pages, where a gentleman states how he had been wandering

about the world like Peter Schmell, only instead of being without a shadow he was without a formula for a weak developer. When, at last, he had made up his mind to seek editorial aid and guidance he finds the shadow he has been so vainly seeking is but a myth; instead of the slow developer required, his paladdin used a quick one almost always. I find it difficult to imagine how anyone could possibly be so devoid of experimental capabilities as to ask for the exact formula for a good weak developer after all that has been written on the subject.

What an audacious man the "Peripatetic" is! He is positively inciting the Editors to commit an act of unparalleled rashness—to describe and criticise, in effect, the properties and excellences of the optical products of rival makers! Just imagine him saying A's new portrait lens is much superior to anything turned out by B, and that B's view lenses are not a tithe of the use that C's are! Would there not be a tempest raised?

I am glad to see him hammering at the same nail as myself—to wit, asking for examples of Leon Vidal's *photochromie*. It has been suggested that M. Vidal endeavours to make the public believe that his process is a sort of photography in colours by one operation in the camera. This, of course, he—and with justice—indignantly denies. It is, he states, "a method invented by himself, in which he combined luminous action with mechanical manipulation."

I notice in the *Moniteur* a droll account of an Englishman endeavouring to photograph some of the Parisian lions. The editor seems highly amused at the idea of this Englishman writing a note to one high in office for permission to photograph, and expecting an answer at the *poste restante*. It is, indeed, just as absurd as though an unknown foreigner were to ask the Lord Mayor's permission to plant his camera on the footpath in Cheapside to take Bennett's big clock—address, "A. B., Post-office; to be left till called for." Our friend was sent about from office to office with as much pertinacity and gravity as a luckless wight gets treated with in this sober country on All Fool's Day. In despair he tried to seduce the allegiance of a *gendarme*, who gravely told him he would be quite willing to shut his eyes himself, but that his successor on the beat was a terrible fellow and would report him at once.

So much for English simpleheartedness, which I cannot allow to go by without first having a laugh at an example of innocency from a foreign source. Herr Linde, at a meeting of the Berlin Photographic Society, held the astounding belief that in England photographers everywhere adopted an uniform colour for their *carte* and cabinet mounts, which would lead to a pleasant uniformity when placed in albums which allowed the mount itself to show. I wonder what two constant advertisers in this Journal, Messrs. Marion and Co. and MM. Rohaut et Hutinet, would say to this strange utterance! Another statement of a similarly Munchausen-like character has come from our American brethren relative to an Australian production to be seen in the Philadelphia Exhibition. We are asked to believe that the negative cost ten thousand dollars to produce, and that each print would entail an expense of one thousand dollars! I should like to have a commission to do a few on these terms.

It is really again getting time for the process-mongers to have something in hand; nothing of the sort has been tried for some months now. I do hear a rumour that some one is trying to make capital out of the half-tone *process* (fine art by machinery again!), the manner of producing which, by the special manner indicated, has been published scores of times in this Journal.

The dark room millennium is at hand. I learn from a great authority that Dr. van Monckhoven is able to produce a white light in his room by the combination of a red and a green glass, the light thus mixing and producing white. Those may believe this who like. I don't!

FREE LANCE.

FOREIGN NOTES AND NEWS.

VEGETABLE GELATINE: FURTHER DETAILS.—THE SULPHURIC CONTENTS OF THE EXHALATIONS FROM THE COMBUSTION OF LIGHTING GAS.—BICHROMATE OF POTASSIUM IN THE STUDIO.—HERR SCHLICHT'S EMULSION PLATES.—THE PERMANENCE OF CARBON PRINTS.

A FEW more details, gleaned from a variety of sources, respecting the vegetable gelatine mentioned in last week's *Notes* may not be uninteresting. According to the *Journal Pour Tous*, in addition to the thao imported from Asia, it has been prepared in pretty large quantities on the French coast, especially in Bretagne. In 1868 or 1869 M. Leon Vidal recommended Japanese vegetable gelatine, which is identical with thao, for the carbon process in hot countries; but as yet his recommendation seems to have been but little taken advantage of, probably owing to the extreme dislike photographers have to change.

According to the director of the Oriental Museum at Berlin, Herr von Skala, there are several sorts of vegetable gelatine made in Japan. One of these, called in the Malay language "*agar-agar*," is prepared by the Chinese and Japanese from a sort of *algae* called *Plocaria candida nees*, found on the rocky shores of the Malay islands. This sea-weed is boiled down to a sticky, viscous jelly, which is used for food as well as in the manufacture of silk and paper.

The Chinese lantern with the common bamboo frame is generally made of paper rendered transparent by being saturated with this substance. *Agar-agar* also furnishes an excellent paste which is not attacked by insects. Over 150,000 piculs (a Chinese weight), = 60,470 kilogrammes of *agar-agar*, were sent to Shanghai alone in 1869, where the worth of a picul rose to six dollars, while in the southern ports it only brought from one and a-half to two dollars. The excellence and cheapness of this gelatine makes it worth the attention of European manufacturers. Besides that prepared from *Plocaria candida*, a gelatine suitable for various purposes is also prepared from *Glacillaria primosa*, which furnishes the *Collocalia* swallows with the materials for building their nests (edible bird's nests), as well as from other sorts of sea-wrack. In the French report on the London Exhibition of 1862 the annual export of *agar-agar* from Singapore was given at 1,320,000 kilogrammes. Another account from Japanese sources says:—*Agar-agar*, or vegetable isinglass, is a gelatinous substance prepared from *Gelidium corneum* and *Plocaria candida*. These *algae* are washed and boiled until they form a glutinous decoction, which is carefully strained and poured into square boxes. When cold it forms a gelatinous mass that is easily cut in pieces. In order to get rid of the superfluous water the strips of gelatine are exposed during the night to the cold night air, by which means they are frozen. In this condition the whole mass is exposed to the sun, which melts and causes to flow away a certain quantity of water, while the substance soluble in warm water remains behind, and on being cooled again returns to its gelatinous consistency. This article has already gained a certain celebrity in Europe amongst the professors of the culinary art, being used as a foundation for jellies and for the clearing of soups, &c., instead of isinglass, which it closely resembles both in its origin and preparation.

In the minds of most people there is an impression that workshops and places of business largely lighted by gas are unhealthy, and many know that this unhealthiness is due to the presence of sulphur in some form—generally supposed to be sulphurous acid. Comparatively few, however, of those personally affected have reflected that, owing to the ease with which the *sulphurous* acid thrown off in the process of combustion picks up oxygen from the air of the apartment and becomes *sulphuric* acid, the bad effects of lighting by gas are more strongly felt in those warehouses or workshops where metallic wares or other goods liable to be affected by sulphuric acid are stored. Attention has lately been called to the extent to which this conversion of sulphurous into sulphuric acid takes place by recent experiments.

According to the *Chemisches Central-Blatt*, Herr A. Vérigo has ascertained the sulphuric contents of the lighting gas of Odessa, and in the months of November and December he found it equal to 1·8 and 2·2 grammes per 100 English cubic feet. With this gas he made the following experiments:—In a room whose cubic contents were 1000 feet, and the atmosphere of which was completely renewed before the experiment, test papers (potassic iodide starch paper) were suspended at various heights in order to detect the presence of sulphurous acid, and six gas flames were lighted. In ten minutes the presence of sulphurous acid was indicated by the test-papers hung highest up; in another ten minutes it was also indicated by those about half way up, and after thirty minutes it was shown quite near the ground. In this way, before the end of the experiment, about forty papers had become of an intense blue, and in each sulphuric acid was recognisable. He then took a bundle of cotton threads weighing about 450 grammes, washed it well in distilled water, and made it imperfectly dry. This was then hung up in the room and the burners lighted. In three hours the experiment was concluded, and the now perfectly dry threads were washed in distilled water. The washing water showed a strongly acid reaction, which remained after being brought to the boil; it contained but a very small quantity of sulphurous acid, so that the acid reaction depended much more upon the sulphuric acid. By several experiments the quantity was found to be from 0·05 to 0·01 grammes. This experiment showed that the sulphurous acid produced by burning in ordinary circumstances is very easily changed by oxidation into the higher sulphuric acid, which can then be readily absorbed by porous substances.

In an article in the *Photographische Correspondenz*, on *The Hygiene of the Photographic Studio*, Dr. Liesegang enters at some length on the subject of poisoning by internal and external applications of salts of chromium, with special reference to the risks to health attending their use in the various photographic processes in which they are employed. He premises that chromates in general are very interesting to the toxicologist, on account of the poisonous nature of their internal and external action; that they produce the symptoms of an irritant poison; and that there is reason to believe they act powerfully on the nervous system and lungs. A fatal dose of a *bichromate* is so small that this class of salts almost deserves to be classed along with arsenic acid and corrosive sublimate. The *chromates* are far less deadly, so that when a person has been poisoned with a bichromate the reduction of that salt to a simple salt by means of magnesia, sodic-hydro-carbonate, &c., is part of the treatment. With the poisoning by internal doses we have nothing to do here, as the photographer is not likely to swallow any of his chemicals. Should he, by any conceivable or inconceivable means, accidentally do so of course the proper thing to do is to call in a doctor, and, pending his arrival, Dr. Liesegang recommends that the extremities should be well rubbed with alcohol containing five per cent. of ammonia.

In the manufactories where chromates and bichromates—such, for instance, as bichromate of potassium—are made in great quantities the external action of these salts is most injurious, entering as it does the eyes, nose, and mouth in the form of dust, and permanently injuring these organs; but many persons deny that from weak solutions, such as are used by photographers, similar bad effects are to be apprehended. Dr. Liesegang, however, can testify from his personal experience that by the prolonged action of a warm solution of bichromate of potassium used for developing carbon prints an eruption broke out upon his fingers which was very difficult to get rid of. This eruption is much more likely to make its appearance when the skin is abraded, and some persons are much more easily affected by it than others.

Dr. Liesegang's preventives are simple. They are:—Care never to keep the hands in a solution of bichromate of potassium when the skin is broken; care to wash the hands in clean water after each time of working with a bichromate solution, and before the latter has had time to dry into the skin; and washing the face carefully whenever one has reason to suppose that bichromate in the form of dust has been, as the Americans say, "flying around." In short, they are—care and perfect attention to cleanliness.

Herr E. von Schlicht, of Potsdam, one of the most persevering of German experimentalists with emulsions, mentions, in a communication to the *Mittheilungen*, that he is now so successful in preparing "Newton plates" that he no longer requires to import dry plates from England, but can use those prepared by himself for the finest microphotographs, such as are enlarged a thousand times by Hartnack's lenses. He no longer uses laudanum (the action of which is similar to that of morphia) as a preservative, as plates so treated only kept a few days; but he has been induced to use instead pure tannin, and finds the change most advantageous, as the plates, without being less sensitive than formerly, may now be kept for a much longer time. He has already kept some for a month, and does not yet know how much longer they will keep. To make them transparent and yet do away with reflection from the wrong side of the glass, he coats the latter with raw sienna, as recommended by Dr. Vogel.

Many persons still hold to their original opinion that the goal of photographic ambition, permanent pictures, has not yet been attained by the so-called permanent carbon process. They contend the probability is that, although to a certain extent the chromated gelatine is rendered insoluble by the action of the light, still gelatine, being an organic substance, must of necessity remain liable to be affected by other agents, and, therefore, be more or less subject to change. This view is supported by a well-authenticated story told in a recent number of the *Moniteur de la Photographie*. M. Fleury-Hermagis, the well-known optician, has a country house near Varenne, at the mouth of the Marne, which some months ago was flooded along with the surrounding country. The water subsided in time, but the house was so damp that it was scarcely possible to get it perfectly dry again. On going over the house in order to estimate the damage done, M. Fleury-Hermagis found that most of the chrome-gelatine pictures had suffered from the damp. The injuries generally took the form of mould, thus showing that the various manipulations had not rendered the gelatine absolutely unchangeable. On the other hand, it must be borne in mind that, according to Collas, the presence of a thousandth part of phosphate of lime in a solution of gelatine is sufficient to cause the rapid development of mould and fungi. The afore-mentioned chemist has observed that in such a case gelatine exposed to the atmosphere becomes covered with fungi in the course of four-and-twenty hours. Unfortunately commercial gelatine, being usually prepared from the very cheapest materials, generally contains phosphate of lime. In this case it is advisable to add a small quantity of borax to the gelatine or the pigment intended to serve for the production of carbon pictures, as the borax, being a remarkable antiseptic, will protect the gelatine from change, as salicylic acid does india-rubber.

British Association.

GLASGOW MEETING, 1876.

There is no loss without a corresponding gain; and in spite of the present paucity of papers of purely photographic interest which are submitted to the British Association we can see, with the eye of hope, a plethora at the forthcoming meetings of the various photographic societies. To the preference which photographers naturally display to having their papers read before technologists by whom their merits can be adequately appreciated we trace the fact that at the Glasgow meeting we have not had a single paper on a strictly photographic subject.

Respecting the city of Glasgow, in which the meeting has been held, little need be said. Its importance as a vast commercial and manufacturing emporium is too well known to require comment. With regard to the number of members and associates that were present it was greater than it has been for a number of years, and the thanks of the scientific public are due to the inhabitants for the very handsome way in which the Association has been entertained in every respect.

The meeting next year will be held in Plymouth, and that of the following year in Dublin.

The following abstracts will interest our readers:—

Section A.—Mathematical and Physical Science.

Tuesday, September 12, 1876.

ON A METHOD OF PHOTOGRAPHING THE DEFECTS IN OPTICAL GLASS ARISING FROM WANT OF HOMOGENEITY.

By Howard Grubb, M.C.E., Trinity College, Dublin.

The best practical method used for detecting in discs of optical glass defects arising from want of homogeneity is possibly well known to many amateurs, as well as professional opticians.

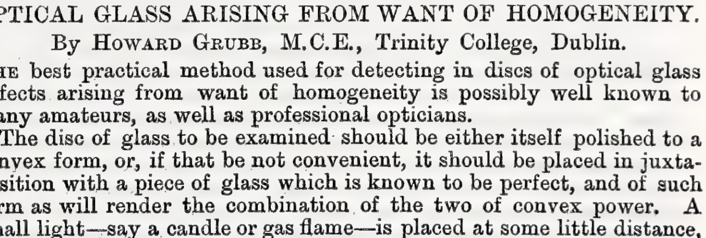
The disc of glass to be examined should be either itself polished to a convex form, or, if that be not convenient, it should be placed in juxtaposition with a piece of glass which is known to be perfect, and of such form as will render the combination of the two of convex power. A small light—say a candle or gas flame—is placed at some little distance, and the eye is placed in the conjugate focus, formed by the lens, of this light. The disc of glass should then appear brilliantly illuminated; but if the pupil of the eye be drawn slightly to one side, so that the pencil of light falls upon only one half of the pupil, immediately and most distinctly almost any want of homogeneity is easily seen.

I say "*almost* any want of homogeneity" because I believe that, with one exception, any kind can be detected; but I have met, very rarely, instances of one peculiar class of this defect which it is not possible to detect till the disc is actually worked into an objective. This happens when a slight, gradual change of density occurs between two portions of the disc with no abrupt line of separation between.

Now this process, though a very simple one to a practised eye, is by no means so to an uneducated one; and I have often desired a method by which I could graphically represent those faults, so that I might be able to communicate to others my ideas as to their exact forms and appearance, position in the disc, and soforth, and also to form a record of them.

This, by a very simple contrivance, I have succeeded in doing, and I am now able to photograph these defects in optical glass with perfect certainty. A glance at the diagram will suffice to show the principle by which this is effected.

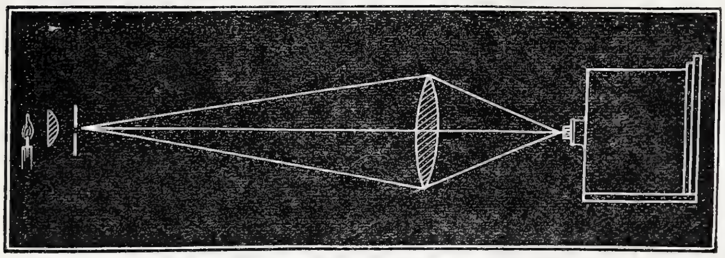
FIG. 1.



The eye, in the first instance (that of eye observation *fig.* 1), is replaced, in the second case, by a photographic camera, and, with a little

care in adjusting the image of the diaphragm illuminated by the lamp on the diaphragm of the photographic lens, very excellent photographs can be obtained. In fact, the stops of the lens replace the pupil of the eye, the photographic lens, the crystalline lens, and the sensitised plate the retina.

FIG. 2.



The defects arising from want of homogeneity in optical glass may be divided into three classes:—

1. Threads or fine seams of some different quality of glass passing through the otherwise homogeneous disc, sometimes insignificant, sometimes long, but very rarely of any width. These are of little importance.

2. Veins, or syrupy bands. These are portions of glass, of differing and various densities, not properly amalgamated. Their appearance is that produced by adding a strong syrupy solution to water. The forms of these veins are frequently very fantastic. This form of defect is sometimes very detrimental.

3. Occasionally, but very rarely (only four times in my experience), have I met with discs of glass having a density slightly different in various parts without any well-defined line of demarcation between the different parts. This is most destructive to its performance as an objective, and a most dangerous fault; for, whereas in the two former cases the defect can be easily detected, this third defect defies detection until the disc has been formed into an objective. It is fortunate for opticians that this defect is of such rare occurrence.

METALLIC REFLECTION.

Professor G. Stokes read a short paper on a phenomenon of metallic reflection which he discovered some time ago, and had not before seen noticed. When Newton's rings are formed between a lens and a plate of metal, and are viewed by light polarised perpendicularly to the plane of incidence, we know that as the angle of incidence is increased the rings, which are at first dark-centred, disappear on passing the polarising angle of the glass, and then reappear white-centred, in which state they remain up to a growing incidence, when they can no longer be followed. At a high incidence the first dark rings are much the most conspicuous. To follow the rings beyond the limit of total internal reflection we must employ a prism. When the rings formed between glass and glass are viewed in this way we know that as the angle of incidence is increased the rings one by one open out, uniting with bands of the same respective orders, which are seen beneath the limit of total internal reflection; the limit or boundary between total and partial reflection passes down beneath the point of contact, and the central dark spot is left isolated in a bright view. Now, when the rings are formed between a prism with a slightly convex base and a plate of silver, and the angle of incidence is increased so as to pass the critical angle, if common light be in view, in lieu of a simple spot we have a ring, which becomes most conspicuous at a certain angle of incidence well beyond the critical angle, upon which it rapidly contracts and passes into a spot. As thus viewed the ring is, however, somewhat confused. To study the phenomenon in its purity we must employ polarised light, or, which is more convenient, analyse the reflected light by means of a prism. After further explanations of the phenomenon Professor Stokes gave some illustrations of it.

Sir William Thomson remarked on the interest and importance of Professor Stokes's discovery, and regretted that he had so long kept it to himself.

POLARISATION OF LIGHT.

The Rev. J. Ker, LL.D., performed an interesting experiment proving rotation of the plane of polarisation of light reflected from a magnetic pole. Dr. Ker explained that he had come forward with his paper at the request of the President of the section, feeling that when the Association honoured Glasgow with a visit the Glasgow people ought to do all they could to make the meeting a success.

Professor Stokes remarked that Dr. Ker appeared to have made a remarkable discovery.

Dr. Ker, in reply to Mr. Guthrie, said he had never tried silver for the reflective surface.

The President, in thanking Dr. Ker, said his discovery was one of the greatest science had recently recorded. He hoped he would pursue his investigations.

SOLAR PHOTOGRAPHY.

Dr. Jules Janssen, of Paris, read a paper *On Solar Photography with Reference to the History of the Solar Surface.* He spoke of the importance of having continuous photographs of the solar surface, and explained the method by means of which he had obtained accurate large photographs of the sun's surface, which showed the mottled appearance of the surface. If these photographs could be reproduced on paper they could be interchanged between the different observatories, and thus a series of most valuable results could be obtained.

ECLIPSE OF THE SUN.

Dr. Janssen read a paper on the eclipse of the sun observed at Siam in April, 1875. He stated the results obtained, one of the chief being to clear up some obscurities about the atmospheric effects during solar observation. He also referred to the results of the English expedition, which confirmed his own results—that the corona and the chromosphere were two distinct layers of the solar atmosphere, the green hue of the corona not being seen in the protuberances.

Dr. Schuster said a great many interesting points were raised by the communication they had just heard. He would just indicate a few. The first was that Professor Janssen had had the kindness to refer to the observations they took in Siam about the different and relative intensity of the different rays sent out by the protuberance and those sent out by the corona. The relative intensity of these was different. Mr. Lockyer had made some observations on the subject. The theory of the spectrum analysis indicated that such a difference in the relative intensity should exist, and that in raising the temperature the blue rays should come out to be more intense relatively to the red rays as to raise the temperature; and that was what was observed in nearly every spectrum. As they raised the temperature they would find that the relative intensity of the blue rays became stronger as they raise a a stronger intensity. Another point was the detachment of Venus from the corona proved that the corona really existed. He would only mention the attempt which had been made to explain this phenomenon by the refraction of the silver light through the atmosphere of Venus; but he thought that explanation had completely failed, and he did not himself see any other explanation of the phenomenon as that the planet had really been seen from the corona. Another point of great importance was the observation of Professor Janssen as to the continuous spectrum of the corona, because that at the same time would explain also the discordant results which had been obtained in the polarisation of the corona. They knew that, as regarded the polarisation of the corona, different observers at different times had got quite contradictory results; and if, as Professor Janssen had observed, the atmosphere had a great deal to do with this phenomenon, the atmosphere would not only explain the continuous spectrum, but also the peculiarity which had been observed in the polarisation of the corona. He might mention, in conclusion, the great assistance which the English expedition in Siam had received from Professor Janssen. They arrived at the spot about 1875, before the beginning of the eclipse; and with the weather it was impossible for them to land the instruments in the first twelve hours, so that, practically, they had only four days before them. None of them had ever before seen an eclipse, and he himself had had very little experience in putting up the instruments, and so on; and they derived enormous assistance from the advice given to them by Dr. Janssen.

THE RADIOMETER.

Mr. W. Crookes, F.R.S., read a paper *On the Influence of the Residual Gas on the Movement of the Radiometer.* He said he had on the table before them some new forms, or experimental forms, of the radiometer, which probably would almost explain themselves, and he need scarcely enter into much description of them at present; but he wished to bring before them some experiments which he had recently made, and which, he thought, went very far towards explaining the cause of the movements. When the experiments were first tried he was inexperienced in the methods of getting a vacuum to any great perfection; and the inference was almost irresistible that the better the vacuum the stronger the movements—that when he got up to the ultimate expression of perfect vacuum he should get the strongest movements of all. That opinion he then held very strongly, and he believed he printed it. Subsequent experiments, however, showed him that that was not quite correct. He had since been trying to ascertain experimentally—because it had been shown theoretically by several physicists—whether a perfect vacuum would produce any stronger movements than ever, or would it stop the movements altogether. He thought he had succeeded in proving the case that a perfect vacuum entirely resists movement, and that movement was not transmitted through a perfect vacuum; and he had also succeeded, he thought, in the much more difficult task of measuring the exhaustions at those very high tensions which produce the stronger action, and also measuring the different amount in different conditions of the gas which he had experimented with. He continued as follows:—

The apparatus, which is too complicated to describe without a drawing, has attached to it a Sprengel pump; an arrangement for producing a chemical vacuum; a lamp with scale, on which to observe the luminous index reflected from the mirror; a standard candle at a fixed distance; and a small vacuum-tube, with the internal ends of the platinum wires close together. I can therefore

take observations of—(1) The logarithmic decrement of the arc of oscillation when under no influence of radiation; (2) the logarithmic decrement of the arc of oscillation when a candle shines on one end of the blackened bar; (3) the appearance of the induction-spark between the platinum wires. 1 measures the viscosity; 2 enables me to calculate the force of radiation of the candle; 3 enables me to form an idea of the progress of the vacuum, according as the interior of the tube becomes uniformly luminous, striated, luminous at the poles only, or black and non-conducting. The apparatus is also arranged so that I can try similar experiments with any vapour or gas.

The following are some of the most important results which this apparatus has as yet yielded:—Up to an exhaustion at which the gauge and barometer are sensibly level there is not much variation in the viscosity of the internal gas (dry atmospheric air). Upon now continuing to exhaust the force of radiation commences to be apparent, the viscosity remaining about the same. The viscosity next commences to diminish, the force of radiation increasing. After long-continued exhaustion the force of radiation approaches a maximum, but the viscosity measured by the logarithmic decrement begins to fall off, the decrease being rather sudden after it has once commenced. Lastly: some time after the logarithmic decrement has commenced to fall off, and when it is about one-fourth of what it was at the commencement, the force of radiation diminishes. At the highest exhaustion I have yet been able to work at the logarithmic decrement is about one-twentieth of its original amount, and the force of repulsion has sunk to a little less than one-half of the maximum. The attenuation has now become so excessive that we are no longer at liberty to treat the number of gaseous molecules present in the apparatus as practically infinite; and, according to Professor Clerk Maxwell's theory, the mean length of path of the molecules between their collisions is no longer very small compared with the dimensions of the apparatus. The degree of exhaustion at which an induction-current will not pass is far below the extreme exhaustions at which the logarithmic decrement falls rapidly.

The force of radiation does not act suddenly, but takes an appreciable time to attain its maximum; thus proving, as Professor Stokes has pointed out, that the force is not due to radiation directly, but indirectly. In a radiometer exhausted to a very high degree of sensitiveness, the viscosity of the residual gas is almost as great as if it were at the atmospheric pressure. With other gases than air the phenomena are different in degree, although similar in kind, aqueous vapour, for instance, retarding the force of repulsion to a great extent, and carbonic acid acting in a similar though less degree. The evidence afforded by the experiments, of which this is a brief abstract, is, to my mind, so strong as almost to amount to a conviction that the repulsion resulting from radiation is due to an action of thermometric heat between the surface of the moving body and the case of the instrument, through the intervention of the residual gas. This explanation of its action is in accordance with recent speculations as to the ultimate constitution of matter and the dynamical theory of gases.

Professor Honey said he was very glad that Mr. Crookes was satisfied that a mechanical cause, and not the direct action of light on the disc, was the cause of the motion. This theory of radiation would be the means of enabling us to gain further insight into the properties of the molecules of bodies.

Mr. O. Reynolds remarked it was said there was joy in heaven when a sinner repenteth, and he supposed we ought to rejoice when a philosopher admitted his error; and a more complete come-round to the theory which he (Mr. Reynolds) pointed out three years ago could not be.

A vote of thanks was given to Mr. Crookes for his paper.

Section G.—Mechanical Science.

Tuesday, September 12, 1876.

NEW FORM OF LAMP.

Mr. R. Lavendar, Kirkcaldy, read a paper descriptive of a lamp specially adapted for collieries, the merit of which was that it gave a great light at a small cost. The lamp, as shown at Kelvingrove Museum, consists of a glass lantern eighteen inches square, with a funnel twenty-four inches high. Into this is introduced a jet of steam, about one-sixteenth of an inch in diameter, the object of which is to create a partial vacuum in the lantern. The consequence is that the surrounding air is forced through the burner of the lamp, causing almost complete combustion of the oil. A very brilliant light is thus produced, which is increased, partly owing to the products of combustion being continuously removed and a volume of fresh air being introduced. The results obtained from a four-inch wick had been equal to a light of upwards of 600 sperm candles.

SOIREES.

As usual, *soirées* and *conversaziones*, of which there were three, were held during the meeting. At one of these, in the Corporation Galleries, were exhibited a large collection of philosophical instruments, embracing electric coils and Geissler tubes, with a large number of microscopes, contributed by the firm of Messrs. G. Mason and Co., of Union-street; an automatic changing-box and camera slide, by Mr. George Hare; a pocket camera, with dark slides and stand, by Messrs. Rouch and Co.; and a variety of geological specimens, by members of the Philosophical Institute. The various objects were inspected with much interest by a crowded assembly. The Photographic Exhibition, too, was also open during the evening, and gave great pleasure to the visitors.

GLASGOW PHOTOGRAPHIC EXHIBITION.

Nothing could in a more unmistakable manner attest the zeal and energy of the photographers of Glasgow than the splendid exhibition of photographs which has been open during the meetings of the British Association. Quantitatively considered it is surprising how so large a collection could have been brought together during the brief period that has elapsed since the "happy thought" first struck some photographic enthusiast of the desirableness of such a display. As regards quality it is alike worthy of a society which has shown so much energy as that of Glasgow, of the artists who have contributed of their pictorial treasures to grace the collection, and of the country to which photography at its earliest period owes so much. The exhibition was—nay *is*, for it still remains open—held in the Philosophical Institution, and it reflects the highest credit upon Messrs. John Jex Long, Thomas Annan, A. Robertson, George Mason, and John Stuart, upon whom devolved the arduous labour of collecting and arranging the photographs.

The display embraces specimens of nearly every description of photographs produced in the city of Glasgow—prints in silver, in platinum, and in carbon, or, to speak more correctly, in pigments. There are numerous coloured photographs, from the smallest ivory miniature to the oil-finished enlargement; in one room almost the entire number of exhibits are coloured.

In landscape work the lovely Highland lochs, straths, glens, and mountains in the vicinity have furnished ample and choice food for the cameras of several of the exhibitors, among whom Mr. G. W. Wilson—who has so long devoted himself to subjects of this class—occupies a chief position. This artists exhibits several instantaneous views on the Clyde; among these is an instantaneous picture, *The Last Bell*—which is a view of one of the Clyde steamers about to start, and which picture contains thousands of passengers and visitors—is deserving of the most minute examination. In no respect inferior to this is a view of *Camstraddan Bay, Loch Lomond*, and a view of *Luss Straits.*

Mr. Valentine, of Dundee, also contributes a choice collection of views of the rich and varied scenery of Scotland, among which we may notice with special commendation *Ben Nevis*, from Corpagh. In scarcely any respects less excellent than the foregoing picture is *A View at the Tail of the Bank, Greenock.*

The photograph of *Glasgow University*, by Mr. Thomas Annan, is a charming picture of large dimensions. In keeping with this is his *Glasgow Cathedral*, and other views taken in the locality. We may, however, direct special attention to a series of twenty-four views, taken to illustrate the scenery of Loch Katrine—the source of the water supply of Glasgow—and also the charming scenery along the route taken by the pipe line supplying the necessary "element" to that populous city. It need scarcely be observed that the scenery here depicted is very charming. The views by Mr. Annan could scarcely fail to be attractive, for in a country so beautiful a clever artist is bound to produce results in keeping with the nature of the subject, and this Mr. Annan has done.

Messrs. Rutherford Brothers have contributed several excellent photographs, comprising landscape studies and groups. There is a very fine collection of landscapes by Mr. John Parker—an amateur—among which are one or two that, despite the dark tone in which they have been printed, we have seldom, if ever, seen surpassed. We regret our inability to name these, as the titles of the subjects are not appended to his pictures.

A variety of views in the Botanic Gardens and the Kibble Palace are exhibited by Mr. T. Swan, who is also an amateur. They are of cabinet dimensions, and form a series of excellent photographs of a most delightful locality. Mr. Smithels—also an amateur—shows a number of attractive cabinet views, of which *The Head of Loch Katrine* is a charming example.

There are several other landscapes by local artists; but, owing to the absence of a catalogue, we are unable to describe them.

In a city like Glasgow, which contains so many professional portraitists of eminence, it was to be expected that in an exhibition of photographs we should find many exceptionally-fine portraits; nor have we been disappointed.

Mr. John Stuart, of Buchanan-street, contributes a large and very valuable collection, and it is worthy of observation that, with the exception of one fine enlargement finished in oils, the whole of Mr. Stuart's pictures are in carbon, executed by the chromotype or the Lambertype process. This artist was one of M. Lambert's first pupils, and his artistic progress in this peculiar line has done much credit to

his able teacher, for his works in this direction cannot be surpassed. To say that his portraits are as brilliant and full of detail as the finest silver prints is only to state a simple fact.

Mr. James Bowman also contributes largely both in small and large work, plain and coloured. The tone of this artist's pictures is a very deep brown bordering on black. Good manipulation and careful posing are the characteristics of Mr. Bowman's work.

Adjoining Mr. Bowman's pictures are several specimens by Mr. M'Nab, West Nile-street. They are by the Lambertype process, and are exquisite examples of this kind of portraiture.

We have already spoken of the landscapes of Mr. Annan. This gentleman is also a large contributor to the portrait department, among his exhibits being portraits of eminent members of the British Association and also of the Scottish nobility.

In the large, charming, and varied collection of Messrs. Alexander Brothers, of Renfield-street, coloured work forms the *specialité*. In this department these artists occupy a foremost place in the pictorial ranks of Scotland. To attempt a detailed notice of the numerous examples of their artistic work in this brief survey is impossible; hence we content ourselves by stating that their exhibits are executed in oils and water colours upon ivory, paper, opal glass, and canvas.

Specimens by the platinum process of Willis are exhibited by the Albion Albumenising Company; but surrounded as these are by the warm-toned prints of Wilson, Valentine, and others the platinum tones appear somewhat cold by contrast.

Mr. Henderson, of Perth, exhibits several admirable portraits and enlargements, one of the latter class, *Herodias*, being exceptionally excellent. They are executed by the Lambertype process, in which Mr. Henderson appears to be an adept.

Mr. Stuart, of Sauchiehall-street, exhibits an enlargement finished in water colours, which is worthy of admiration for its delicacy of finish. Mr. McKenzie, of Paisley, contributes largely. His pictures possess the qualities of refinement combined with vigour. There are two well-coloured portraits on opal glass, which are exhibited by Mrs. M'Millan.

Among those residing at a distance who have sent contributions to this exhibition are Messrs. Elliot and Fry, Messrs. A. and J. Bool, Mr. J. Werge, of London; Mr. Marshall Wane, of the Isle of Man; Messrs. Diston, of Leven; Wyles, of Southport; W. Brown, of Edinburgh; and Frith, of Reigate.

It is to be regretted that the absence of any name, either of artist or of subject, on the pictures prevents us from noticing numerous other pictorial gems in this exhibition.

ROYAL CORNWALL POLYTECHNIC EXHIBITION.

Photography: Judges' Report.

The Judges in this department have great pleasure in bearing testimony to the splendid collection of photographs exhibited this year. They consider them the finest ever brought together in the West of England.

A first silver medal for the best portrait is awarded to Messrs. Geo. Cooper and Co., of Hull, for No. 687, a portrait of an old gentleman—an exceedingly fine photograph, being one of four which they exhibit taken direct from life. They also send a large photographic picture, *The Holderness Hunt*, from several negatives taken in the field.

A first silver medal for the best group is awarded to Mr. Nesbitt, of Bournemouth, for No. 696, *The Finishing Touch*. This is an extremely artistic production, well grouped, and a splendid photograph. A maid is giving the finishing touch to the toilet of her mistress, who is dressed for a ball. The delicate shades in the dresses are beautifully rendered. Mr. Nesbitt exhibits nine others evidencing the same artistic feeling. No. 688, *Evening Prayer*, is full of poetry. No. 692, *Morning*, and No. 693, *On Guard*, are both well conceived and executed.

A first silver medal is awarded to W. D. Sanderson, of Manchester, for No. 767, a fine photograph of a *Trout Stream*, by a dry process. This picture is quite equal to any we have seen taken by the wet process; it is full of the most beautiful detail.

A second silver medal is awarded to Messrs. A. and J. Bool, of London, for their fine photograph, *On the River Womble*. It is taken from a well-selected spot, has a fine, sharp foreground, and an exquisite middle distance full of atmosphere. They exhibit others showing the same skill; also a case of photographs of *Old London*, which are valuable in more than a photographic sense.

Mr. B. Wyles, of Southport, sends a series, including portraits, landscapes, and a church interior. A second silver medal is awarded to him for No. 738, *Whence Hangs a Tale*. They all show Mr. Wyles loves his art, and is a thorough artist in feeling. No. 743, *Grapes Not Sour*, is an excellent picture. A well-to-do and happy young lady is looking out, smiling, near trellis work with vines trained over it. No. 736, *The Llugwy*, is a fine photograph with very successful sky and a well-rendered distance. No. 737, *The Conservatory*, is full of the most delicate detail.

Mr. A. F. Smith, Llandudno, sends a series. No. 734 has a second silver medal awarded to it. The interior is exceedingly good; and his *Olden Time*, No. 733, a group, is very cleverly executed. So is No. 732, *Spring*, another group, showing Mr. Smith to be an artist working in the right direction, and not a mere mechanical photographer.

Messrs. Brown and Barnes, of Liverpool, exhibit a case of portraits by their patent mezzotint process, which are exceedingly artistic. The apparently rough paper background enhances very much the fine quality of the delicate shades of the faces. A special second silver medal is awarded for their large transparencies, No. 710, *The Brook*, and No. 711, a waxed-paper negative; and a first bronze medal for their enlarged portrait, No. 708. Others exhibited by them bear the stamp of high-class work.

Mr. Widger, of Torquay, has a first bronze medal awarded to him for No. 762, *Cockington*, Torquay. No. 759, *Holy Street Mill, Chagford*, is an excellent rendering of the mill from a well-selected spot. No. 760, *Exeter Cathedral*, is very good indeed.

Messrs. E. P. Lee and Co., of Cardiff, have a special second silver medal for their excellent case of ceramic photographic enamels.

Mr. Warwick Brookes, of Manchester, sends four very fine portraits with characteristic ornamental borders, representing literature, drama, art, and masonry.

Messrs. Chaffin and Sons, of Yeovil, send two very fine large portraits, beautifully modelled and well lighted; also a very fine group. The Excelsior Photographic Company, of Seaton, exhibits four artistic and well-executed portraits.

Others exhibiting first-class work are Mr. A. G. Tod, of Cheltenham, (his No. 677, *Drawing Room, Hatherley Lawn, Cheltenham*, is a splendid example); Mr. Frederick Palmer, of London; Mr. H. Hogg, Westmoreland; Mr. E. Bligh, Fowery; Mr. J. Milman Browne (his No. 718, *The Wishing Gate*, and No. 716, *Falling Leaves*, a study, are good examples showing patient and loving study); and Mr. R. Griffiths, Truro. Mr. G. Cocking, of London, sends fine examples of his highly-artistic work; Nos. 730 and 731 are particularly good. Messrs. Barry and Co., Hull, exhibit a large case of portraits, showing delicate manipulation, with good lighting and posing. Mr. George F. Dew, sends some of the best landscapes in the exhibition; his No. 783, *On the Avon*, and No. 782, *A Pleasant Nook*, are particularly good.

The amateur department is well represented by Mr. Crawshay, who sends twelve examples of his painstaking and exceedingly-artistic studies, showing that he has an eye for the beautiful in nature everywhere, as evidenced by the variety of his works.

Mr. W. J. A. Grant has a first silver medal awarded to his *Tree Studies*, No. 823, which rank among the best in the exhibition.

Mr. R. O. Milne has a first bronze medal awarded to his No. 829, *In Kincorth*.

Mr. H. Manfield exhibits some good views near Lynmouth.

Mr. H. A. H. Daniel has a second bronze medal for his No. 822, *The Old Bridge*. He exhibits five others, which are very clever productions.

Mr. Henry W. White sends a splendid collection of photo-ceramics, showing that he is not easily daunted by difficulties, which are many. He has succeeded in getting more than a dozen colours, or tints rather. We wish him every success in future. A second silver medal is awarded to Mr. White. Thomas Hart, *one of the Judges*.

SCIENTIFIC JOTTINGS.

One of the most noticeable features of recent continental literature has been the attention given to the radiometer; but a short time ago one might have looked in vain for any allusion to it in such pages, while now it is scarcely possible to take up a foreign scientific serial without coming across an article or two devoted to the subject. Many very interesting experiments have been made upon its indications under a variety of different circumstances, with, sometimes, unlooked-for results; but the main outcome of the whole is a confirmation of Mr. Crookes's own opinion, that it is to heat, as popularly understood, rather than to light, that the motion is owing.

Silver—its production and price—still continues to keep a firm hold of the photographic mind. It has been thought that a rise in price of a permanent nature would take place in its value, and in accordance with it one of the largest manufacturers of nitrate of silver, after having reduced it, raised the price one penny per ounce, only, however, to drop it again within a few weeks. New sources of the metal are being discovered continually. The latest we read of is the spongy silica, which is found in vast quantities round the great Salt Lake of Utah. It exists in the shape of chloride, in company with varying proportions of iron, copper, and lead (in various forms), in the proportion of from four to five pounds per ton. To elaborate a plan of extraction considerable difficulty has been experienced, owing to the presence in such large quantities of the silica (about ninety per cent.). Smelting is thus impossible, and it is found that hypo., as also the alkaline chlorides, do not dissolve it out sufficiently. Interesting particulars are given of the method adopted to recover it, which are briefly as follow:—The ore is boiled with hydrochloric acid till it breaks up; then another quantity of acid is added, and gradually one-sixth part by weight of manganese oxide. When chlorine ceases to be evolved the whole is washed well with water, and the silver precipitated from the solution by treatment with iron. A little lead and copper contaminate the product, but they can be removed by cupellation.

The other new source of silver is in the Troitzker district of the Government of Ovenburg, where it occurs associated with an almost vertically-

disposed quartz vein, which penetrates a white crystalline schist. This ore has an opposite character to the Utah deposit, being of very hard, glassy texture; and the silver is found combined with chlorine, bromine, and iodine, and sometimes native in the shape of scales, in bands on one or both sides of the vein. Though, so far, the deposit has only been worked for a depth of about a score of yards deep and about three times that distance laterally, upwards of a hundredweight has already been extracted by the "amalgamation process." Silver deposits of a similar nature, famous for their richness, are found in Chili, Mexico, and Spain, and it is usual to find that the deeper the ore the richer it is in silver. In winter the operations are very suggestive of photographic difficulties, for we read that it takes just double the length of time that is needed in summer to extract the metal.

Our notes on gold refer us to a process for determining the amount of gold in pyrites by M. H. Schwarz. He melts the gold with fine iron turnings under salt, and treats the sulphide thus formed with dilute sulphuric acid. After washing and drying the residue he roasts it, and then mixes it with a little borax and some lead, melts in a muffle, and, finally, cupels the little globules thus obtained.

We have more than once experienced, and, doubtless, many of our readers have similarly suffered, the loss of a large glass vessel through the occurrence of a crack, produced no one could tell how; but when, on one occasion, an unusually thick vessel fell to pieces before our eyes, though it had not been touched or heated for some days, the cause became plain to us. The fracture and the cracking arose from the imperfect annealing of the glass, which remained whole till some unnoticed vibratory impulse caused sufficient molecular disturbance to allow the stronger of the unequal strains existing in the mass to assert itself, and, overcoming the cohesion of the whole, to produce a crack or a complete fracture according to its strength. To guard against such accidents a suggestion has been made by G. Hagenbach in *Poffendorf's Annalen*, to examine all glass articles by polarised light, when, if a hidden flaw exist, its presence will be revealed by the occurrence of prismatic colours. He was led to this discovery by the examination of some fragments of two glasses which had suddenly cracked in the unexpected manner we speak of; they all showed prismatic colours.

We can supplement our remarks on freezing mixtures in last month's *Jottings* by some further observations which have been since published. Using sulphuric acid and snow, which produced a temperature of 37° C., L. Pfaundler reasoned that if he could reduce the temperature of the material he used he would be able to produce a still lower temperature. Accordingly he packed a tall cylinder with snow, and, pouring in the acid, soon obtained the temperature as above. A series of layers is formed, which increase in temperature downwards; but the excess of acid in contact with the upper layer having now reached a temperature of 37°, a temperature considerably under this point will be obtained as it percolates downwards and comes in contact with very cold snow. Temperatures of from 50° to 60° were thus obtained. In a paper by J. Tollinger (*Wien. Auz.* 1875, 172) will also be found two useful tables giving the result of his experiments in connection with freezing mixtures of nitrate of ammonia with water and with snow.

It is desirable to keep a chronicle of every substance alterable by light, as no one can predict which will be the next that will be of use to photographers. We accordingly note the oil of elæococca, which is amenable to solar influence in a very peculiar manner. The neutral oil, liquid at ordinary temperatures, is changed by the rays of the violet end of the spectrum into a solid of a buttery consistence, which requires an increase of temperature of about 58° F. to bring it to its original state. An opening for practical application might be found in the fact that, when saponified, the solid oil yields a mixture of fatty acids differing from the product of the liquid oil.

Still another process for producing formic acid in a state of great concentration and purity has been published by M. Lorin. He distilled a mixture of sodium formate and oxalic acid, dry and in powder, and obtained a product containing ninety-nine per cent. of the acid.

We referred on a previous occasion to the proof of the presence of minute quantities of iodine, &c., in the atmosphere, and their possible influence on the sensitive wet plate. A further contribution to this subject is made by Dr. Phipson, who, in *Comptes Rendus*, gives a number of cases of the occurrence of metallic dust in the atmosphere in situations where it could not well be derived from artificial sources; and he states that there certainly exists in the air a great number of substances which ordinary chemical analysis fails to detect. When we know how the simple passing of a perfectly clean glass rod across a plate will cause a stain upon developing, it is easy to imagine how these metallic particles may form centres of abnormal action.

In the same journal will be found particulars of a reaction which will be of great interest to photographers who study the question of permanency of silver prints. The belief in the value of the well-known iodine reaction for detecting the presence of hypo. in prints may require considerable modification, for M. E. Puchol finds that the sensibility of starch as a reagent for iodine is effected by certain nitrogenous matters, among them being albumen. He states that if iodide of starch suspended in water have albumen poured into it the colour disappears, and also that if albumen be added to a solution of starch saturated iodine water produces no colouration. The effect of coagulated albumen, such as is found on a silver print, is, however, not alluded to. Further experiment may show it to be inert, and it is to be hoped that such is the case.

A new use has been found for "hypo.," namely, for the detection and determination of potash. It is always a difficult and delicate operation to determine the amount of potash in any mixture; and, to take an instance, to discover the amount of it in collodion of unknown strength, it would be the easiest plan to do it by indirect means, but this new process places a comparatively easy method in our hands. We quote the following from the paper of M. A. Carnot:—"Dissolve in a few drops of hydrochloric acid one part of a subnitrate of bismuth—say half a-grm.—and, on the other hand, about two parts (one grm. to one and a-quarter) of crystallised hyposulphite of soda in a few cubic centimetres of water. The second solution is then poured into the first, and concentrated alcohol is added in large excess. This mixture is the reagent. If brought into contact with a few drops of the solution of a potash salt it at once gives a yellow colouration easily recognised. All potassic salts with mineral acids were equally susceptible of this reaction." It is easy to see how useful this readily-prepared reagent might be to the photographer. For further particulars we would refer him to the original paper in the *Chemical News* for the 1st instant.

Correspondence.

DIRECT POSITIVES FOR ENLARGING.

To the Editors.

Gentlemen,—Will you kindly give me your advice? I have amused myself with taking whole-plate landscapes, but find the expense of taking my camera, dark tent, &c., too heavy, so have gone in for small negatives for after-enlargement.

As, however, for this enlargement it is necessary to take a positive from the negative (and this is the question), would it do to take landscape positives? I have never worked in positives, and do not know how it would do. If it would I should make the enlarged negative direct and save the double operation.—I am, yours, &c.,

Ercand, July 31, 1876. J. E. Gubbins, *Capt.* R.A.

[Captain Gubbins raises a question which is being much discussed by photographers at home as well as in India, and it is one which is in a fair way of receiving a successful practical answer. We have seen transparencies produced in the camera possessing such great sharpness as to bear being enlarged three or four diameters without *practical* loss of definition. The way to proceed is to use bromised emulsion plates. Give a good exposure, and develope with an alkaline pyrogallic solution. After washing pour nitric acid on the surface, by which the negative will be converted into a positive or transparency, owing to the dissolving away of the silver which formed the negative image. Now wash, and again apply the alkaline developer previously employed, and which should be retained in the cup for this purpose; hold the plate in the light for a few seconds, and a very rich and finely-toned transparency will reward the slight amount of trouble thus taken. The sharpness will be sufficient to admit of the details being examined under a microscope.—Eds.]

TRANSPARENT SPOTS IN NEGATIVES.

To the Editors.

Gentlemen,—With reference to the transparent spots, which form the subject of your leading article of last week's Journal, I would suggest "*petere fontes*" in the shape of the back numbers of the photographer's *vade mecum*—The British Journal of Photography.

I think it probable that an explanation will be found in a communication from Mr. M. Carey Lea, published at page 219 of the last volume, and entitled *Transparent Spots, Filaments, and Motes in Wet and Dry Plates.* There Mr. Lea attributes the formation of both circular and streaky spots to hyposulphite of soda dust settling on the plate—the former caused by contamination of the plate before coating, and the latter by the same cause after coating the plate with collodion. The remedy suggested is to conduct all operations with hyposulphite of soda in a place apart from that in which the plates are prepared, and to use a strong bristle brush for dusting the plates previously to pouring on the collodion.

Of course, I do not pretend to say that this is the explanation of the particular spots referred to; but I think it extremely likely, as you have observed *two kinds* of spots—circular and comet-like—and for these the hyposulphite hypothesis offers an explanation hardly to be found in the "bromo-nitrate" theory.

If I remember rightly a correspondent on one occasion attributed certain transparent spots to undissolved gum-ammoniacum, as on

shaking the emulsion well the same spots did not result. This does not seem likely to be the case, as probably the gum would have been added to the emulsion as an alcoholic *solution*. Again: it is difficult to conceive how the gum, if perfectly soluble, and in such small quantity, could escape solution when in contact with the solvents during several hours. It is certainly true that the gum would be precipitated by the water used for freeing the emulsion from solubilities, but the precipitate would be in so finely divided a state as to be dissolved as soon as the solution of the collodion pellicle had been effected.—I am, yours, &c.,

Cotheridge Court, Worcester, HERBERT B. BERKELEY.
September 11, 1876.

CORRECTING AN OBJECT-GLASS.

To the EDITORS.

GENTLEMEN,—With reference to the description given in your *Foreign Notes and News* of a method of correcting the object-glass of a telescope by the separation of its component parts, permit me to inquire in what way this separation can be effected when the flint and crown glasses are cemented together with Canadian balsam, which, if I mistake not, is always the case with astronomical objectives?—I am, yours, &c., J. ROBERTSON SMITH.

Brighton, September 12, 1876.

[We believe we are quite correct in stating that no large astronomical objectives are cemented, those of telescopes of small dimensions only being subjected to this operation; hence the difficulty imagined by our correspondent does not really exist. The reason why large objectives are not cemented is that as the flint and crown glass have a different ratio of expansion by change of temperature, the performance of a telescope would be seriously impaired by such a change if the object-glass were cemented.—EDS.]

UNIFORM PRINTING.

To the EDITORS.

GENTLEMEN,—In reference to the communication of "W. H. F.," in last week's issue, upon *Experiments in Printing*, I must say I was pleased to see it, although, on the other hand, sorry that other amateurs were troubled in the same way as myself. In my mind I believe failure in producing *uniform* prints arises from photographers not being aware of the chemical salts used in the preparation of albumenised paper.

I have gone so far as to prepare my own albumenised paper, not using any chemical salt whatever, and my cause of failure I entirely attribute to the want of these salts. Now, if anyone will offer me experience and advice respecting the proper salts required for the preparation of albumenised paper, I shall be most happy to make known my experiments of the same, trusting they may be of service to the great body of amateurs who fail from want of knowledge respecting the chemicals contained in the albumenised paper.—I am, yours, &c.,

September 13, 1879. T. P.

[There is some obscurity here. Does our correspondent go the length of saying that he prepared his albumenised printing paper without any chlorides, such as those of ammonium or sodium? If so, he certainly stands alone in his practice in this respect.—EDS.]

EXCHANGE COLUMN.

No charge is made for inserting these announcements; but in no case do we insert any article merely *offered for sale*, that being done at a small cost in our advertising pages. This portion of our columns is devoted to exchanges only. It is imperative that the name of the person proposing the exchange be given (although not necessarily for publication, if a *nom de plume* be thought desirable), otherwise the notice will not appear.

Mahogany half-plate bellows-body camera, two dark slides, rising front, in exchange for Marion's screw cameo press.—Address, A. LEE, 4, Prince's-buildings, Bath.

For exchange, either of the following, and cash for pair of new symmetrical lenses:—Pair of Ross's stereo. lenses, or pair of globe lenses, value £8 each pair.—Address, J. H. T. ELLERBECK, Southport.

Wanted to exchange, a pair of Newton's best lanterns and twenty slides, cost over £15, for a Ross's portable symmetrical lens for 12 × 10 plates.—Address, HENRY LAW, 36A, Gold-street, Northampton.

Rolling-press, 18 × 12, double-geared, by Bury, planed iron bed, one good *carte* rolling-press, Solomon's daylight enlarging apparatus, suitable for Lambertype, Meagher's binocular camera, three double backs for plates 7½ × 5, handsome new mahogany show-case, and two good landscape backgrounds, to be exchanged, in whole or in part, for a good box tent for 10 × 8 plates, or eight and a-half square bellows camera, with folding tailboard, by any known maker, and good cabinet backgrounds by Bull or Marion.—Address, H. C. J., Photo. Studio, Queen-street, Norwich.

ANSWERS TO CORRESPONDENTS.

☞ *Correspondents should never write on both sides of the paper.*

*** Owing to a brief absence from home we are compelled to leave over replies to numerous correspondents. These will be attended to in our next.

REGISTRATIONS.—Next week.

FIVE YEARS' SUBSCRIBER.—You must comply with the conditions which have been so often printed at the head of our "Answers to Correspondents'" column. To our rule requiring the names of querists no exception can be made.

YOUNG GEORGE.—Of the various pictures that marked No. 2 is the best. The defect at the lower left-hand corner will not seriously interfere with the value of the negative, because the subject will make a finer picture if vignetted than if printed out.

PROFESSIONAL (Edinburgh).—Enough has been written to enable you to arrive at a conclusion respecting the propriety of continuing to practise the process without obtaining a licence. We must decline to answer your question, which is one for a solicitor, a patent agent, or counsel.

PYLOS.—If you make your bath from ordinary "lunar caustic" the chances are that you will obtain the presence of nitrite of silver. By fusing together nitrate of potash and nitrate of silver, applying a brisk heat, the same result is obtained. We think the presence of nitrite will not prove of any value in an old disordered bath. For a case of this kind the best remedy consists in its reduction.

H. G. C.—From the description of your failures in photolithography it seems probable that you are making use of a negative deficient in intensity. Select one the whites of which are perfectly opaque, the blacks being clear glass. If you are inexperienced in photography you may make a negative for experimental purposes by coating a glass plate with opaque black varnish, and, when dry, scratching a number of lines upon it. With a negative of this kind give an exposure of fifteen minutes to sunlight. There is no such work published as that about which you inquire.

HUGH HENDERSON.—It is evident that something is wrong with the acetate of soda. About three weeks ago we were shown a sample of what was obtained from an extensive firm of manufacturing chemists as acetate of soda, but which would not give the same result as that secured by using another sample. The formation of the crystals was so different from any that we had previously seen that, without testing it, we concluded that a serious mistake must have been made. Yours may possibly have been procured from the same source.

RECEIVED.—Leon Vidal; A. Ford Smith; J. Johnston; A. B.; A. R. G.; F. J.; H. A. H. Daniel.

THE POWER OF IMAGINATION.—A young lady in Reading, Pa., U.S., has just died from sheer fright, produced through a foolish fancy. Having had her photograph taken she showed a copy to her mother, who discovered the form of a skull on the picture. Another skull having been figured out the young lady grew pale, took to her bed, and died.

SOUTH AFRICAN INTERNATIONAL EXHIBITION.—An International Exhibition will be held in Cape Town in 1877, in a building to be erected for the purpose, by consent of the Colonial Government. It will include manufactures of all kinds. The date fixed for the opening is February 15th, and everything intended for the exhibition must be shipped from London not later than during the first week in December, 1876. Intending exhibitors should communicate immediately with Mr. Edmund Johnson, Commissaire Délégué, at the European Central Offices of the Exhibition, 3, Castle-street, Holborn, London. Photographs will be exhibited in Class IX, which is concerned with science and education, books, maps, charts, printing machinery and materials, photographic instruments, instruments of precision, measures of length in metal and ivory, tape, riband, or wood, meteorological, nautical, optical, and astronomical instruments. Gold and silver medals and diplomas of merit will be given to successful exhibitors.

METEOROLOGICAL REPORT,

For the Week ending September 13, 1876.

Observations taken at 406, Strand, by J. H. STEWARD, Optician.

THESE OBSERVATIONS ARE TAKEN AT 8 A.M.

Sept.	Bar.	Wind.	Wet Bulb.	Dry Bulb.	Max. Tem.	Min. Tem.	Remarks
7	29·55	W	55	59	67	55	Cloudy
8	29·70	W	51	55	64	49	Cloudy
9	29·79	W	60	63	62	46	Bright
11	29·81	NW	50	55	60	49	Cloudy
12	29·88	NE	50	52	59	48	Dull
13	29·80	NW	48	52	—	45	Cloudy

CONTENTS.

THE BRITISH JOURNAL OF PHOTOGRAPHY.

No. 855. Vol. XXIII.—SEPTEMBER 22, 1876.

DEVELOPMENT AND HALF-TONE.

Since writing, three weeks since, on the subject of *Half-Tone in Emulsion Negatives* we have been engaged in a series of comparative trials with the object of testing accurately the results of different methods of development upon dry bromide films, both as regards sensitiveness and half-tone, but chiefly the latter, and we trust our readers may consider the matter of sufficient importance to engage their attention for a brief period.

So much has recently been written on the subject of alkaline development that it is unnecessary here to add to what has gone before, and we may therefore pass it over except in so much as its use enables us to fix a standard by which to judge the comparative qualities and capabilities of other methods. These are limited to variations in the ordinary silver method with iron or pyrogallic acid, no other developing agent having, so far, proved itself capable of producing a satisfactory result.

The discovery of the principle of alkaline development undoubtedly gave a powerful impetus to the popularisation of dry-plate photography, and its advantages over the old system in point of rapidity were, perhaps, permitted to overpower other good qualities possessed by the system it was intended to replace. Be that as it may, it is certain that at the present day very few photographers, especially amongst those who work with plain bromide plates, ever think of using any other than the alkaline form of development, and even for intensification silver is now almost entirely driven out of the field. Whether this be altogether judicious or not we are scarcely prepared to say, as a very great deal must naturally depend upon other attendant circumstances; but it is obviously our aim to employ that method which combines in the highest degree and under special conditions those good qualities usually sought after. Thus, other things being equal, a developer which works with a given exposure is preferable to one requiring double that time; but, on the other hand, it is decidedly impolitic to remain content with an inferior quality of picture simply because it may be produced with a shorter exposure by following some particular formula.

With this idea in view we undertook the comparative trial of various modes of development in order to satisfy ourselves if the supremacy of the alkaline pyro. is so marked as to justify its universal employment to the total exclusion of other forms. The first and most natural method to follow is undoubtedly the pyro. and silver, which was the one in most general use before the introduction of alkaline pyro. A number of plates were prepared from the same sample of washed emulsion, and treated in every way so as to secure perfect uniformity of conditions. A standard image having been formed for comparison, a number of exposures were made of varying length in order to discover the relative sensitiveness of the two methods. In order to make the test as reliable as possible the exposures were made to a gas flame, which appeared to us to offer less chance of variations in intensity than would be the case with direct daylight.

The solutions employed consisted of a one-and-a-half-grain solution of pyrogallic acid, a thirty-grain solution of citric acid, and a twenty-grain solution of silver. We prefer using the different ingredients separately instead of making up a combined solution, as greater facilities are thus offered for varying the respective proportions to suit circumstances. The result of a few trials showed us that this developer necessitated an exposure between three and a-half to four times as long as would be required if alkali were employed; the development was slow but regular, and well under control in every respect; the image of very good quality, with a tendency to harshness, provided a sufficiently long exposure as above be given. It is possible to secure a fair result with a much shorter exposure than we mention, but in that case the result is inferior in more ways than one, the prevailing defect being a tendency to hardness.

So far as regards comparative rapidity. In order to test the capability of rendering half-tone we adopted another course. The plates were exposed in pairs for different lengths of time under a negative full of detail and possessing every gradation of density. Each pair of plates was exposed for the relative length of time to suit the developer employed and calculated upon the basis of the previous experiments; that is to say, the plate developed by the silver method received about three and a-half times the exposure of the other, and different exposures were given, still adhering to that proportionate difference in order to show the effect of under- and over-exposure respectively upon the action of the two developers.

A very general idea prevails that the distinctive characteristic of silver development upon dry plates is a tendency, more or less prominent according to circumstances, to hardness and excessive contrasts. Under certain conditions this may be true, but our experiments sufficed to prove most fully that such is not necessarily the case, but that, on the contrary, in the qualities of brilliancy and softness *combined* the images produced by the silver method far surpass the other. We agree that accidental results of unusual excellence may occasionally be obtained by using alkali, but these are the exceptions rather than the rule, while the silver method may be calculated to produce the same result with the greatest certainty.

Passing on to the actual results of our experiments, which, as we have said, were decidedly in favour of the silver method, we found that with the negative we were employing an exposure of twelve seconds at a distance of a foot from the gas flame gave the most satisfactory result with alkaline development, while an exposure of three-quarters of a minute produced a result as near perfection as possible under the action of pyro. and silver. Starting from these two plates as standards we varied the exposure in both directions, the shortest time given (with alkaline development) being five seconds, the highest forty, the companion plates of the pairs receiving proportionately longer and being developed by the other method. The practical lesson derived from this series of plates was interesting and instructive in the extreme, and demonstrated better than pages of description the difference between the principle of the two actions. Taking the comparative effect of lessening or increasing the exposure, we found in the case of alkali that in proportion as the exposure was decreased so did the image gain in brilliancy, but at the expense of softness; while, if the exposure were lengthened, the *detail* was improved without a corresponding increase in the force of the shadows, and thus a flat result obtained. But the most noticeable feature in this part of the operations was the "flattening-up" appear-

ance complained of two or three weeks ago by "W. H. F.," and which he designates "hardness." The latter is, however, scarcely the correct term for the defect—a flattening of the details to one even tint or nearly so, which in an extreme case might result in the production of an image consisting of little more than light and shadow without half-tone. It is caused, as we have before endeavoured to show, by the inability of the film to pass beyond a certain density under the action of alkaline pyro. Curtailing the exposure produced less injurious effect upon the alkaline-developed plates than upon the others, while the latter were better able to withstand the effects of over-exposure. Beyond repeating that the results were in every way superior we can say little more of the working of the silver developer under variations of exposure. One thing, however, is of the utmost importance, namely, the adoption of a proper system of development. We will give a brief description of our mode of procedure.

The plate, having been moistened with dilute alcohol and washed in the usual manner, is flooded with a sufficient quantity of the pyro. solution of the strength mentioned in the early part of this article, which is then returned to the measure, and one drop each of the citric acid and silver solutions added. If the picture appear too rapidly more acid may be used; but, as a rule, even when quite fully exposed, the plates develope very slowly at first, and it requires a little experience to enable the operator to judge whether the exposure has been sufficient or otherwise. The main point is to use the silver sparingly—at least until the details are well out. If, in order to quicken the development, the silver be added too quickly the inevitable result will be hardness; the whole secret of success lies in the proper use of the silver. Next week we shall have something to say concerning iron development.

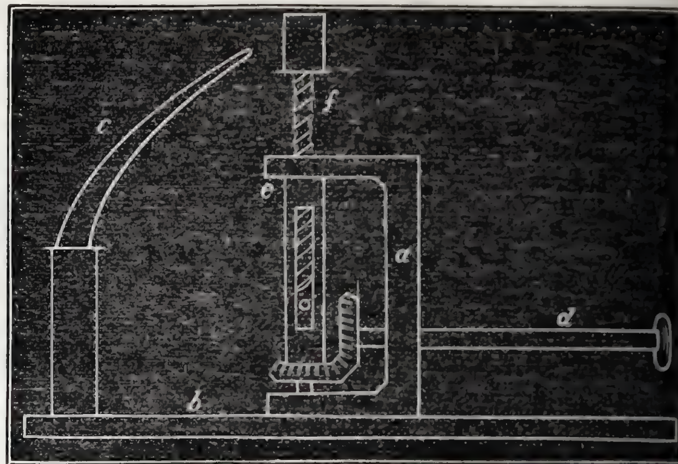
A CONVENIENT OXYHYDROGEN BURNER.

The subject of the oxyhydrogen or lime light is one that is now so intimately allied with the practice of numerous photographers as to render acceptable to our readers any hints which may conduce to the further efficiency of this favourite source of illumination. Whether it be employed in the production of enlargements, or for the exhibition of transparencies by the agency of the lantern, the lime light is exceedingly useful to the photographer.

On a recent occasion, when visiting Mr. E. Viles at Pendryl Hall, we examined with much interest his large dissolving lanterns, for we knew from reputation that they were as perfect as the adoption of every valuable suggestion in their construction could render them.

The method adopted for adjusting the lime to the impinging jets of gas, and for rotating, raising, or lowering it in relation to the flame or the condenser, seemed to us to possess greater advantages than the other methods in common use for this purpose. The system of opening the door of the lantern while the lime was being adjusted is one which cannot be too strongly reprobated, because it not only disturbs and attracts the attention of those in the vicinity, but in many instances it causes the emission of a dazzling ray of such brilliance as to contract the pupils of the eyes, and otherwise render them unserviceable for several minutes. This method, we repeat, is a most objectionable one, and although it still sometimes prevails yet it is noticeable that it is less prevalent than formerly. The minute inspection of the flame is rendered quite easy owing to the insertion of small panes of glass of a very dark colour in the doors of the lantern. The depth of tint of these panes is such as not to allow of the escape of a beam of light of such luminosity as to be visible to those in the vicinity of the lantern, while it does not prevent anyone who places his eye close to the pane from seeing the flame and burner distinctly. This being the case, it only remains that the varied adjustments of the lime and the burner be controlled from without in order to secure the most perfect management of the lantern without any inconvenience whatever.

By the aid of a diagram we shall endeavour to explain the construction of the burner to which we have alluded; and, while we are quite certain that the form in question is not much known, we abstain from putting it forward as anything new, because the mechanism is such as will possibly have been previously impressed into the service of the lime light. We have no hesitation, however, in presenting it to our readers on the score of its utility, and we do so with strong commendation.



In the diagram *a* represents a small framework made of cast brass, and sliding on the base, *b*, of the burner. Projecting outside of the lantern (not shown in the diagram) is the axle *d* terminating in a knob. Fixed to the opposite end of the axle is a bevelled wheel, which is geared into one of a similar form; and the axle of this latter wheel consists of a piece of tube, *e*, capable of containing the small screwed rod, on the top of which is placed the lime cylinder. There is a vertical slit in one side of the tube, through which may be seen the lower end of the screwed rod *f*. A pin is fixed into this rod near to its lower end, and, as it projects out through the slit in the tube, any circular motion given to the tube will impart the same motion to the screw. Now, as this screw *f* works or screws into the upper arm of the frame *a*, the simple circular motion of the tube causes both a circular and an upward or downward motion of the lime cylinder.

The method of using this burner is as follows:—As the knob *d* projects behind the body of the lantern its simple rotation suffices to revolve and raise, or lower, the lime cylinder; but it may also be pushed forwards or backwards without affecting the gearing of the two-bevelled wheel, and by this action the frame *a* is slidden along the base *b*, the effect being to bring the lime cylinder farther from or nearer to the burner *c*, which, we may here observe, may be of any desired form.

When the lime ball has been thus adjusted in relationship to the jet, the whole system is adjusted with regard to the condenser by pushing the base *b*, upon which the whole is supported, in or out, this base in turn sliding in appropriate grooves in the bottom of the lantern. It is advisable that the threads of the screwed rod *f*, which carries the lime, be very coarse—something like those of an ordinary screw as used in wood-work—for this is found to answer much better than when the threads of the screw are too fine.

We do not consider it necessary to go into the matter in fuller detail; because, from the description here given, every reader having the ability to execute this piece of work will also possess sufficient knowledge to apprehend the best methods for effecting the fittings of the various wheels, axles, and screws.

NOTES OF A RECENT VISIT TO GLASGOW.

No. I.

During the meeting of the British Association at Glasgow a number of local exhibitions, museums, libraries, reading-rooms, factories, and industries of various kinds were generously thrown open to the numerous strangers who visited this city during the week when science held high holiday. The British "scientist"—we thank America for the term—while sticking closely to his hobby in the sectional meetings, whether that hobby be chemistry, geology, or mathematics, never shuts his eyes to the fact that at these annual meetings business is tempered with pleasure, and he usually dips pretty deeply into both.

Glasgow offers unusual facilities for what is now so well known as an "outing." A lowland city, bristling with commerce, utilitarian

yet ornate in its architecture—factories, wharves, and residential palaces apparently struggling for the mastery, yet each blended inseparably with the other, Glasgow is the centre of the highlands—the centre from which proceed boats and trains which, in a few hours, if not minutes, will convey passengers to spots whose loveliness and grandeur defy description. But if verbal description fail to convey an adequate idea of the scenery of the Western islands and highlands of Scotland, how much more will photography with its narrow eye and unpretending monochrome fall short in its delineation? But to return to the *soirées* and exhibitions. In the Kelvin Grove Museum the variety of objects of interest displayed was something astounding. Glasgow is a city which depends to no inconsiderable extent upon scientific discoveries applied to matters of everyday life; hence in this museum, fitted up expressly, so far as we could judge, with a view to the visit of the members of the British Association, whose head-quarters were within a walk of six minutes, it was not unreasonable for us to expect to find—and we *did* find—a large and singularly-fine display of chemicals, the nature of which, however, may not be considered of special interest to photographers.

We have, in our issue of last week, spoken of the interest attached to such photographic apparatus as were exhibited at the *soirées* and *conversaziones* of the Association by Messrs. G. Mason and Co., of Glasgow, and by Messrs. W. W. Rouch and Co., and Mr. George Hare, of London. The numerous and varied articles exhibited by the first-mentioned firm conduced very much to the efficiency of the *soirées;* and when Messrs. Mason and Co. consented to display their unique collection in what we may designate the "permanent" exhibition of the week, the public could not fail to be satisfied with the existing order of things. A little pocket camera by Messrs. Rouch and Co. was most attentively examined by shrewd observers when we last paid a visit to the Kelvin Grove Museum; and, while its functions seemed to be well understood, the visitors appeared as if they were not a little "bothered" by Hare's automatic changing-box, which was certainly examined with great attention, but without much light being shed upon its end or aim, till a gentleman who seemed to be familiar with its action tendered an explanation.

In this museum we saw for the first time the patent automatic lime-light apparatus of Mr. Birrell, which, it may be remembered, formed a subject of discussion between our "Peripatetic Photographer" and the patentee, with respect to the alleged spiritualistic origin of the invention. Whether the apparatus be devised by some one who has "gone before" or by Mr. Birrell himself, there seems no doubt that it will effect the work purported to be done, namely, generate oxygen and hydrogen for the lime-light burner in such proportion as the consumption of these gases demands. We speak, however, without having subjected the apparatus to a practical trial, which would, of course, have been impossible considering the circumstances under which it was examined by us. The advantages claimed for the apparatus are—1. That the gases are made while being used, and, when not required, their production ceases, the demand regulating the supply. 2. The pressure of the gas being once arranged will remain unchanged, or may be altered at pleasure, without the use of weights. 3. Great economy. No superfluous gas is made, therefore none is lost. 4. A stock of the gases can be retained in the apparatus for instantaneous use without deterioration. 5. As the apparatus can be re-charged with gas-making materials without affecting the continuity or brilliancy of the light, a continuous or intermittent use of the same is thereby secured. 6. From the accurate adjustment of pressure between the gases, and the small stock present at any one time, no fear need be apprehended from explosion.

We shall resume these notes next week.

THE PHOTOGRAPHIC EXHIBITION.

[Second Notice.]

The "Royal Engineers" contribute several pictures, some of which are very fine. But at the outset we take exception to the designation here accorded to the artists. Among the Royal Engineers are numerous estimable men who probably are scarcely able to distinguish between an engraving and a photograph, or between a camera and a camera stand; but the present, as well as the previous, exhibition proves that under this designation are also to be found men possessing very high artistic feeling and consummate manipulative skill. Why are the names of the real workers not given? It is very gratifying to our national pride to find that the "Royal Engineers" are such admirable photographers, but we would rather see the names of the individual members of that corps given, so that we might know by whom was taken such a picture as No. 1, *A Tree Study;* No. 86, *The Hillside;* or No. 90, *The Bridge of No Size* (*Sighs*), all of them charming pictures, and the last—despite the desperate attempt at a pun in the designation—a picture which cannot fail to be admired. It seems scarcely generous that the names of the artists should be suppressed. That special "Royal Engineer" by whom was taken the negative of the *View in Sark* (67), has proved himself well able indeed to develope a negative which, when enlarged, shall be very sharp and full of detail.

Glen Druid from the West (4) is the designation of an attractive picture by Mr. T. M. Brownrigg, who exhibits another view of the same subject from the east, and which is but little inferior to the former.

China-maniacs will inspect with much gratification the photographs of Japanese china from the collection of Major Walter, of Liverpool, which has been well taken by Mr. G. H. Dunmore (5); the excellence of these would have been enhanced had a background with a less pronounced pattern been selected.

Nos. 6, 7, and 8 are hung too low for convenient examination; but the centre picture of the three, *Raglan Castle*, by Mr. Baynham Jones, is a bold and successful picture. Softness is the leading characteristic of the other two, which are views in *Dinan*, by Mr. Robert Gordon.

The views in Gibraltar, Tangier, and Tetuan (9 and 10), by Mr. J. H. Mann, are most excellent examples of artistic photography. To be commended in an equally high degree are the several contributions of Mr. J. Milman Brown, whose *Wishing Gate* (12) has the tendency to make one wish very strongly that he were in the vicinity of such a charming rustic spot.

Mr. S. G. Payne contributes a considerable number of interesting pictures, under the title of *Old and New Homes in the Vale of Aylesbury.* We find a collection of photographs of residences of various kinds, both ancient and modern, the technical excellence of which is unexceptionable. Of the pictures by Mr. F. T. Palmer we prefer his *High Rocks, Cheddar Cliff* (16), although its tone is, perhaps, a trifle too cold.

Colonel Stuart Wortley exhibits ten pictures, the greater number of which are marine subjects, such as breaking waves, with bold and effective clouds. Of these, preference will by many be given to *Desolate* (26), representing a ship which at a former epoch has been stranded on the shore, but, owing to the influences of weather and wreckers, has dwindled away to a mere crushed skeleton, visible only at low water. With its wild surroundings it has, indeed, a "desolate" appearance. *Hope* (255) is represented by a wild bit of coast scenery, upon which is seen an anchor. *Out Fishing* (253) is another effective marine piece, the title of which conveys an idea of the subject.

Mr. Crawshay, judging from the number and variety of his exhibits, has been indefatigably at work during the summer, for he is represented by no fewer than twenty-five pictures possessing much merit. At present we shall only notice a few of these. His pictures of the *River Taff*, *Vechan*, *Cyfarthfa*, of which there are five, are probably the finest works of this artist—we mean of a purely landscape kind; for, while the subject itself is a singularly pleasing one, the selection of the points of sight has been most effectively made, and the manipulation such as to yield pictures soft and full of exquisite detail. It is to be regretted that these views are not placed together; they are distributed over the room. A charming example of Mr. Crawshay's handling of a river scene is to be found in that view of the *Taff* which is numbered 59. His

Leaning Tower, Caerphilly Castle (38), as well as *Caerphilly Castle* (63), are skilfully executed, and no archæologist ought to pass by the former of these without examining minutely the ruptured tower, which in its deviation from perpendicularity rivals the celebrated but more modern tower of Pisa.

We shall resume our notes next week.

Some weeks ago, during the hot weather, we were much troubled by the discolouration of a quantity of ready-sensitised paper we had in our possession, and which, in spite of all precautions, persisted in discolouring, chiefly at the edges of the sheets, but more or less over the whole surface. The increased discolouration at the edges pointed plainly to some action either of damp or of deleterious gases, but every care had been taken to protect the paper from all such influences. Many expedients were tried, but without complete success, the most promising consisting simply in packing the sensitised paper between sheets of clean, white blotting-paper, and keeping the whole under slight pressure by placing a few books or other handy objects upon the packing-board covering the paper. An idea was, however, suggested to us in consequence of an untoned print having been placed between the leaves of a book and forgotten for several weeks. This, when found, bore a strong impression of the printing with which it had been in contact, the print appearing *white* upon a discoloured ground. We forthwith obtained a few sheets of black tissue paper, out of which we made a preservative case, and we find that after a lapse of five weeks, during a portion of which period the general temperature was very high, the paper remains entirely colourless, while a piece of the same paper left in the ordinary blotting-case has become visibly and painfully discoloured. What the precise action of the black paper is we do not pretend to say; but it appears probable that the discolouration under such circumstances may be due to a species of fluorescence, the effect of which is destroyed or neutralised by changing the colour of the contact surfaces.

THE USE OF IMPURE WATER IN THE PREPARATION OF DRY PLATES.

Although dry-plate workers are frequently advised to use distilled water for washing their plates, I have reason to believe that very few of them act on the advice, and, from some recent experiments, I have come to the conclusion that it is better not to do so.

For many years previous to 1869 the water used in the whole of my photographic experiments was drawn from a well in my garden. It was only some thirty feet deep, and within forty yards of a running stream of such questionable purity as streams in the vicinity of populous cities are apt to be. The water, however, was bright and sparkling, and although it would, in these days of public analysts, be condemned as unfit for domestic use, I and mine enjoyed excellent health during more than a dozen years with no other supply. It was not a hard water, although it contained traces of both carbonate and sulphate of lime, but its objectionable constituents were organic matter and chlorides, with a trace of nitrites.

In 1869, in consequence of city extensions, our garden became too valuable for the growing of cabbages, and it was handed over to the builder, who filled up the well, and at the present time several streets occupy the site of my early photographic operations. From 1869 down to the present time I have used the ordinary water supplied to the city in the preparation of plates. It is almost free from organic matter, contains a faint trace of chlorine, no nitrites, and is very soft.

During the time I used the water from the well I had experimented with almost every modification of dry-plate work proposed, and had worked some of the methods, such as the Fothergill, tannin, meta-gelatine, beer, &c., &c., extensively, and with almost uniformly good results. Since I began to use the purer water a similar course of nearly constant experimenting or working has been carried on; and, although I am, on the whole, as successful as the average run of dry-plate operators, I think now, and have thought all along, that there was a certain "something" about my earlier work that I do not now secure. What that "something" is it is difficult to define, but it certainly includes a shorter exposure—*i.e.*, a more sensitive film, by the same processes, and a certain crispness and clearness, both during and after development, which made that operation more pleasant and gave the resulting negatives a better appearance. Altogether there was a comfort and certainty in my work previous to 1869 that I have not since experienced.

I need hardly say that much thought and many experiments were brought to bear on the question. Improved methods of washing, drying, and manipulating generally were each in their turn suspected, and on trial pronounced "not guilty," without in any degree throwing any light on the subject; and it was only within the last few days that the quality of the water was taken into consideration. I need not enter into a detail of all the experiments that were made; it will be sufficient to say that plates washed in water made as near as possible in composition to that of our old well were really better than those made at the same time, under exactly similar conditions, but washed, some in the ordinary city water and some in distilled water.

I may state, as the outcome of the experiments, that every kind of dry plate that requires washing will be improved by an addition of five grains of ammonium chloride to each pint of water in which it is to be washed, and that it is especially necessary that the first washing should be done with the chlorised water. I am not prepared to offer any satisfactory explanation of the way in which the chloride acts, and am quite aware of a pretty general impression that its presence in an organifier acts as a retarder; hence the addition of silver recommended by some beer and albumen workers to the preservative for the purpose of removing it.

It is now generally admitted that it is necessary to remove the whole of the free nitrate of silver from most dry plates, and it is possible that one advantage of the chloride in the washing water may be the thorough way in which that is done by its conversion into the chloride. But it is quite certain that there is more than this, and I think it probable that, as the chlorised water penetrates the whole structure of the film, a considerable portion of the insoluble chloride remains and exercises an influence similar to that which it is known to do when introduced into an emulsion in the way proposed by Mr. M. Carey Lea. Be that as it may, I think there is strong evidence that silver chloride introduced in this way not only exercises no retarding influence but really promotes sensitiveness, and I am persuaded that anyone who will give it a fair trial will have abundant proof that it tends to clean development and clear, crisp negatives.

There was at one time a general belief that the office of the so-called preservative or organifier was simply to keep the sensitive film in an open state, and that certainly is one of its uses. Now, this keeping of the molecules of the sensitive salt apart is not unlikely to be more efficiently done by the silver chloride which will be formed throughout its whole structure, its action being merely mechanical so far as that is concerned, although it seems to me quite clear that it also, in some as yet unknown way, exercises a chemical influence.

John Nicol, Ph.D.

ENAMELLING PHOTOGRAPHS.

In the Journal for August 25th are some processes for enamelling photographs.

I have found the following to be the simplest and best, so far as my experience goes:—

Take good, smooth glass; clean it well with rotten-stone, and finally polish with French chalk. Now with a small brush go round the edge to the depth of a quarter of an inch with diluted albumen; this will prevent the film from slipping. Then coat with plain collodion, and let it thoroughly dry. Any number of plates can, of course, be prepared and kept in stock. To enamel provide two tin dishes, one fitting within the other, the outer one filled with water and kept warm with a spirit lamp. Put the warm gelatine in the inner dish, and immerse as many prints as you please in the same. Let them soak thoroughly; then take out each print and draw the back over the smooth edge of the dish to remove surplus gelatine. Next, lay the print on one of the plates (previously warmed slightly) in the same manner as paper is put on the silvering solution. Hold with the thumb and finger with one hand, and with a small squeegee rub lightly over the print to remove air-bubbles.

Let the prints become surface dry, and with glue put on the thin, damped backs of strong paper, and dry for a few hours. Run a knife round the edge under the print to loosen it from the albumen edging, and the picture readily leaves the glass. A. Marshall.

LICHTDRUCK.

This second film may be prepared a considerable time in advance, but the dried plates can only be kept for a few days in a perfectly

* Continued from page 429.

dry place, and should be used and washed as soon as possible, after which they may be stored for years and still remain printable.

I proceed to give an excellent first film, which was introduced, I believe, by our brother professional, Herr Obernetter, who has merited well both of photography and lichtdruck:—Beat to a froth 150 grammes of albumen, and to that add, while still continuing to beat the albumen, 150 grammes of water and 150 grammes of bichromate of potassium. When these are well mixed add thirty grammes of ammonia; stir well, let the mixture stand a short time, and then filter through flannel. This mixture keeps for years; indeed, the older it is the better.

The plates are coated cold with this mixture, and are then set upright to dry at a moderate heat. When dry they are lighted from behind, as already described, and the second film spread over them without washing the plates.

The wooden drying-box is divided in two by a false bottom of thin sheet iron, under which pipes from a neighbouring oven pass backwards and forwards. By that means the temperature in the upper half of the box can be raised to 50° R. In this upper half, above the sheet iron, the iron trivets are placed, and the folding lid is lined with yellow cotton wool, in order to absorb the moisture from the drying plates. This drying-box is, with a few alterations, still much used, but the iron trivets are generally replaced by iron rods furnished with adjusting screws. The rods lie loose at both sides of the box upon ledges, and may be brought nearer to each other or pushed further apart, as is thought desirable, or as the size of the plate requires.

The pipes through which the smoke and heat pass may be replaced by a gas or petroleum stove placed under the drying-box. A yellow sliding panel, through which the drying of the plate may be observed, is let into the upper part of the box, which is also furnished with a thermometer, in order to facilitate the regulation of the temperature.

After the plates are dried and slowly cooled in the drying-box they are exposed under a negative, as already described. The printing-frames are somewhat different from the photographic printing-frames in ordinary use. The negative and the sensitised gelatine are pressed together by wooden wedges, as springs would not furnish a pressure sufficient to secure perfectly sharp printing plates. The sides and back are done away with, in order to facilitate the watching of the printing; and, as a protection against the entrance of light from behind, the back of the printing-frames is furnished with a wooden slide, or they are laid in shallow boxes.

The plates, when fully printed, are placed in a grooved tin box filled with water, and there they remain, the water being frequently changed in the meantime until the yellow colouring has almost disappeared from the chromated gelatine affected by the light; that is, from the drawing of the printed picture. If the water has been often changed or renewed, by addition, the object will be attained in two or three hours. When removed from the water the plates are once more well rinsed and freed from water by laying a sheet of blotting-paper upon them and drawing the hand across it; they may then be used at once to print from, but as far as the durability of the plates is concerned it is better to dry them, and, if possible, to let them lie for a day or so.

In the early days of lichtdruck it was supposed to be necessary to have specially-constructed presses, and in Munich experiments were made with a long-set-aside lithographic roller press, but it was soon rejected as useless. These presses were of similar construction to the burnishing machines, in which the steel plate is pushed through without being fastened to a foundation, the difference being that both rollers were covered with india-rubber. After each print the plate was taken out, rolled, and then pushed into a slit between the rollers, covered with a flannel or india-rubber cloth, and drawn through. Besides breaking many plates, this press had the disadvantage of requiring two persons to attend to it, and, in spite of all, of furnishing but few proofs.

Besides the before-mentioned press, presses on Roderer's system were used, with which one could work faster and more easily. These presses were distinguished by their cheapness; but the rollers, like the whole machine, being made of wood, had the disadvantage of wearing out soon.

The Munich star press *(Sternpresse)*, which is now used by Obernetter and Gemoser, answers its purpose perfectly. It is made of strong wood with iron rollers and levers, and is easy to handle and very serviceable.

The presses on the Sutter system are, however, in spite of their greater cost, to be preferred to all those already mentioned, as they are entirely constructed of iron. The presses should be furnished with double frames. Upon one of these frames a paper or tin mat cut the size of the picture to be printed is fastened; or, still better, four strips of tin are attached to the frame so that they may be moved and fastened, as in this way, by bringing the strips of metal nearer each other or pushing them farther apart, the mat may easily be adjusted to any size of picture. The second frame is covered, as in a lithographic press, with calf-skin. Supposing, now, the printing plate, previously put in its place in the press, to be properly rolled, one places the first frame with the mat upon it, in order to cover the borders which are intended to remain white on the paper. Upon the mat the paper is laid, and above that again the second frame, and then one draws it smoothly through the press. The pressure must be regulated exactly beforehand by slackening the tension a little more than is necessary in printing from stone. In consequence of the foregoing valuable modifications the process already described found an entrance into the lichtdruck establishments.

With Obernetter's bichromated albumen solution a thicker "first film" was prepared with advantage. In order to obtain this a sufficient quantity of the solution is poured upon the plate, and dried in the drying-box at a temperature of from 15° to 20° R. As when heated to a higher degree the film is easily made to spring off, it is necessary to go exactly by the directions. For the same reason the plates should not be removed from the box before they are cold. It often happens that slight rents appear in the first film; but they are of no consequence. The dry plates are laid upon black velvet, and the wrong side lighted. For this process the exposure lasts in summer from a quarter of an hour to twenty minutes, in a medium light half an hour and over, and in winter from an hour to an hour and a-half. Before the application of the second film the plates are laid in warm water of from 40° to 45° R., and allowed to remain there a few minutes until the first film has softened a little; it may then be rubbed under water with the finger in order to remove any dust that may be upon the surface.

When the film has become soft enough it is rinsed with warm water, and the following second film is poured upon the middle of the plate, spread towards the sides, and a little allowed to run off in order that it may carry the water off with it. It is dried in the drying-box at a temperature of 40° R.

SECOND FILM.

1.	Gelatine	90	grammes.
	Water	720	„
2.	Isinglass	50	„
	Water	480	„
3.	Bichromate of potassium	15	„
	„ ammonium	15	„
	Water	360	„

A further simplification of the lichtdruck process was introduced with the water-glass film, which does away with the continual minute lighting and washing with warm water. The mixing of the first film is done by beating albumen to a froth and adding water and isinglass, continuing to beat the mixture for some time, and, finally, filtering through linen. The proportions are:—

Albumen	25	grammes.
Water	45	„
Sodic water-glass	6	„

The solution is poured over the plates like collodion, and they are then set up and left to dry naturally. This being done the plates are slightly washed in a vessel containing water, rinsed, and again dried, after which one can proceed with the preparation of the second film.

Another way of using water-glass as a first film consists of pouring dilute water-glass upon the plate and letting it dry, after which the water-glass is changed into an insoluble compound by being dipped for a minute or two into a solution of baric nitrate. When taken out and well washed with clean water the plate is ready to take on the second film:—

Gelatine	5	grammes.
Isinglass	3	„
Bichromate of ammonia	2	„
Water	70	„

In order to prevent the formation of air-bubbles this film must be carefully poured and spread over the water-glass plates—an object best accomplished with the aid of a broad, wet brush, or a piece of blotting-paper.

Many of the flaws which appear in the preparation of perfect printing plates are caused by the impurity of the materials employed; this is especially the case with isinglass and gelatine. As the former often contains particles of grease, which are difficult to remove, the isinglass is omitted and many disadvantages done away with, as there only remains the gelatine to be purified. The gelatine

is purified by being cut into small pieces and soaked in water, the water being poured off and fresh added as long as a solution of oxalate of ammonia (a solution of one to twenty-five) thickens what is drained off.

Add five drops of ammonia to the white of one egg, and beat to a froth. Continue to beat while adding and mixing gelatine melted by a gentle heat (one egg is enough for about 2·50 grammes of gelatine); then add two or three drops of acetic acid. While being well stirred the gelatine is brought quickly to the boil and filtered, after which the stiffened mass is left all night floating in the dialyser amongst a quantity of water in order to remove the acid. Lastly, the gelatine is dried in the open air at a temperature of from 15° to 18° R.

T. H. Voigt.

(To be continued.)

A NATIONAL TRAINING SCHOOL OF PHOTOGRAPHY.

I have long been of opinion that photography can neither be looked upon or, rather, recognised in the same way as painting and the fine arts, nor that photographers themselves can hold an even rank in society, in common with painters and sculptors, until such time as there shall be a national training school of photography which will grant certificates to students, and also degrees to qualified operators. I was talking to a photographer some few days ago on the above subject, and while he acknowledged the desirability of such an institution being founded, yet he wished to know who were to constitute the governing body, as it would require men of practical as well as theoretical knowledge to be able to grant degrees and certificates. Now I think that, if all classes of photographers would combine, a council or governing body *pro tem.* might be easily formed of the following materials; for, as there are many components parts in photography, so ought the council of the school to be formed. I would propose, therefore, twelve gentlemen of the following qualifications:—Three well-known chemists, who, having passed the Apothecaries' Hall, ought to be a sufficient qualification for photographers that they understand their business; three artists, either painters or sculptors, Royal Academicians; three well-known professors of science, or examiners therein; and three military photographers, officers of the Royal Engineers, &c. (I specially mention the latter, because we believe that, as they have been appointed to such posts by the War Office and military authorities, they must know something about photography, and because it would be most desirable that a photographer of some sort or another should be on the council, although it would be best if it were not an ordinary *professional photographer*, so as to prevent any thoughts of favouritism in granting degrees and certificates).

The school should be founded on a similar plan to the national training schools of art, and a certain *fee should be paid* by the students, with two *yearly* sessions, operating, printing, and other rooms, together with all the necessary apparatus, being the property of the school. Chemicals and materials to be used by the student should be paid for, on exactly the same principle that now exists in art schools, where casts, models, easels, and general furniture are supplied, and are the property of the school. Colours, chalks, brushes, pencils, &c., are provided by the students themselves. By this rule being strictly enforced it would prevent at any time commercial business being transacted by the school, for whatever the students spoiled or wasted would be their own property and not that of the council. In a school of art, if a student spoil fifty sheets of drawing-paper or a dozen canvases he is paying for the same, and he is much more likely to use every piece of paper to its best advantage in order to save his own pocket.

Of course there would have to be a head master chosen by the council, with under-masters, to instruct separate divisions, viz., operating, posing and grouping, printing, retouching, &c., and with eminent gentlemen either in the arts and sciences to give lectures on all subjects likely to be of use in connection with photography; there would, of course, be daily lectures by the masters and others for the benefit of the student.

I have no doubt that in course of time Government would be induced to look with favour on the school, and a national grant would be yearly given in aid of its funds. With regard to a degree, I would recommend the institution of one such as this—"Fellow of the National School of Photography;" and in order to obtain such a degree a similar ordeal as that passed by the Associates and the Royal Academicians themselves would have to be undergone, so that a photographer, before he could put "F.N.S.P." after his name, must necessarily understand, both practically and theoretically, everything that it is possible at the present time for anyone to know in connection with photography. Degrees and certificates would, of course, be entirely distinct, because certificates would only indicate that a young man had passed through the school according to its regulations and to what success he had attained; but degrees would be an after honour and prize.

Depend upon it, this country would never have boasted of so many honoured names in art if there had not been such things as A.R.A. and R.A.; and although there is A.R.H.A. and R.H.A. in Ireland, A.R.S.A. and R.S.A. in Scotland, it is the R.A. of old England that is most highly prized. And it is the winning of that that has cheered on so many students, to whom, though unsuccessful one time, it has given renewed courage for a second attempt. And as it is so in painting, &c., why should it not be so in photography? And, again, there might be a yearly exhibition of the works of the students of the school, showing to whom medals and certificates had been awarded.

Having thus endeavoured to show how a training school for young photographers might be formed, I will now try to point out the advantages such an institution would produce, and the great disadvantages we are at present under from not being possessed of one:—

1. How many photographers are there at the present time that have any knowledge at all of the anatomy of the human form? I believe very few; yet, if the art-education of a painter or a sculptor be not considered efficient unless he can pass a certain rather stiff examination in anatomy, I can scarcely see why a photographic operator's education should be entirely devoid of it. "But," says some one, "a photographer does not draw in the figure like a painter does; the camera and lens do all that." Very true, my friend; but how is it possible for a photographer to correct any distortion and unseemly wrinkles in a face by the means of retouching when he knows absolutely nothing about the conformation of the face? and if he employ a professional retoucher to do the work how can he know if it be rightly done or not? Again: another says:—"But a photographer never makes nude studies like a painter or a sculptor, so that I can see but little benefit arising from being acquainted with anatomy." Stop, my good Sir, are you aware that the fashionable portrait painter of the day, if he have been (and he is almost sure to have been) a student of the Royal Academy, has to pass the same examination as what the figure painter does? and as a photographer is continually engaged in producing portraits he ought to know something of facial anatomy at the very least, and in a training school this would undoubtedly be taught.

2. "Honour to whom honour is due." My reason for quoting this motto is—that at the present time it frequently happens that a man devoid of any education—either general, photographic, or art, but yet possessed of some money—opens a photographic gallery. The work is executed by persons in his employment, and the proprietor, while reaping all the credit for the excellence of the work produced, styles himself "artist"—"Heaven save the mark!" How can he possibly be one, when he knows but a little, if anything at all, about the business. Such a man's real position, commercially, is about the same as a picture dealer's, but with this distinction—that the latter never arrogates to himself the credit of having produced the different pictures he has for sale, whereas the photographer always, or nearly so, does.

I can cite numerous instances where such a state of things exists, and the sooner they are done away with the better for photography. We must remember that every gentleman who has a photographic studio calls himself an artist and a professional man; therefore, such being the case, let them conduct themselves as real *bonâ fide* ones, and let those who execute the work be rewarded with the honour due unto them. With a national training school we should see an important revolution in this; for, depend upon it, that if there were medals—gold, silver, and bronze—given away yearly to the most successful students belonging to the training school, the photographer who was so fortunate as to become the employer of the gold medallist of the year would not long allow either his brethren or the public to remain in utter ignorance of that fact.

I greatly desire the time to arrive when we should possess a training school for photographers, and I am perfectly certain that there is not a single gentleman connected with the profession who would ever regret having been one to come forward to assist in a project that would undoubtedly tend to the elevation and advancement of the photographic art, and, as far as my own abilities are concerned, I would gladly volunteer them to aid in the formation of "A National Training School of Photography."

George Cecil Hance.

PRINTING FROM THIN NEGATIVES.

In your issue of September 8th, a correspondent, "W. H. F.," asks how he can get good paper prints from thin negatives, such as are suitable for glass printing. I am afraid it cannot be done. The negative must be made with reference to the work it has to do, and no one quality will be equally adapted for every sort of printing. It is the same as with lenses. The same lens may be used for both portraits and views, but some of its best qualities will be sacrificed in each case. So with negatives; a medium density will enable them to be used for both glass and paper printing, but in neither case will the best results be attained. Your correspondent refers to several "dodges," such as printing in shade. To these may be added fuming the paper and getting a thin duplicate either on paper or glass to stick on the back of the original negative; but all these are but palliatives.

Except when required for special purposes, such as magic-lantern or stereoscopic transparencies, I would recommend him to take his negatives for paper printing. Glass prints will never be much other than toys, notwithstanding their beauty; or, if this be too great a sacrifice, let him take two negatives of subjects that seem worth it. In no other way can his object be attained. He can try reproducing the negative, as has often been recommended—by our Editors amongst others—but he will find getting a second on the spot more satisfactory and less trouble. With the highest respect for our Editors' dictum, I do not believe that in small work these negative reproductions can be nearly equal to the original.

Russell Sedgfield.

ON THE PREPARATION AND COLOURING OF TRANSPARENCIES FOR THE MAGIC LANTERN.

Chapter IV.—Colouring—*(Continued).*

In laying on the colour of draperies, if the garment or curtain be large and in heavy folds, do not attempt to go over the whole at once, but with a full brush paint one fold at a time, as any join in the colour which would be otherwise apparent will be lost in the deep shadows of the fold, which will rather improve it than otherwise; the one colour overlapping the other will give intensity to the shadows, which is required. Make it a point to have some pure white in the picture, as white will stand for a colour, and will harmonise with any other, and also give the proper tone to all the other tints in the picture. White drapery means simply leaving the clear glass uncoloured in the high lights, and painting the shadows with Payne's grey. After the figures are all painted in the foreground may now be finished, warm colours of a suitable strength and consistency being used for the high lights, but the shadows cool—say with Payne's grey or purple composed of Prussian blue and rose madder, toned down with the slightest tint of burnt sienna. Any foliage or plants in the foreground should be put in with bright green—say Prussian green for the shadows and half-tones, and the high lights with brown pink. Brown madder may be used for the stems and trunks of trees, and also for dry grass or reeds.

The picture having been gone all over in the form of tinting, a small brush can now be used for the stippling, and any other small details which could not be done sooner, such as the eyes, the markings of the hair, nostrils, lips, &c., and also the deepening of any shadows which might be required. All this is quite simply and safely done on the top of the colour already laid on, provided the caution or rule already given is observed, namely, not to draw the brush twice over the same spot with a wet brush, unless it be desired to remove the colour. If a touch has been laid on which is not deep enough never mind; let it dry and come back to it. Keep moving the brush from place to place—a touch here, a touch there, always coming back until it is coloured to the proper tint. Any amount of work may be done on the picture after a little practice. But if a fine engraving or photograph is being coloured, do not attempt to improve the engraving or photograph *as* an engraving or photograph. Stick merely to the colouring, as, however nice it may appear to the eye on the slide, any alteration will be distinctly seen on the screen, and the artist who drew the picture would have made the alteration had it been an improvement.

This reminds me of a circumstance which once happened to myself, and which forcibly illustrates the above caution. I was playing the flute part in one of Handel's oratorios, and, coming to a fine, easy passage, I put in a few nice little grace notes which I thought sounded very well; but I was rather "taken down" when my companion, who was playing alongside me, asked if I was trying to improve Handel! I never forgot this lesson. Had Handel intended any grace notes they certainly would have been put there. Now, there are many things we do in our profession where it might very appropriately be asked if we were trying to improve Handel. As it will depend altogether on the skill and experience of the artist as to the finish of the picture, I would recommend beginners to be content with simply tinting the transparency.

In preparing photographs from nature for colouring it would be advisable to paint out the sky in the negative, so that a clean, clear ground may be got for putting in an effective sky, as very few photographs can show a sky that would look well on the screen. Beautiful moonlight effects may be produced by painting in an all-blue sky with Prussian blue and Payne's grey, graduating the tint, of course, from a deep blue in the zenith to a lighter tint at the horizon. After this is done come over the whole landscape, be it photograph or engraving, with pure blue. When dry—if the picture be from a photograph—wipe out the shadows and paint them in with burnt sienna, mixing it with a little crimson lake as the foreground is approached. If an engraving the shadows may be painted with sepia, using brown madder for the foreground shadows. The difference between a transparency from an engraving and one from a photograph is this:—In the one the colours are seen between the lines pure as they are laid on, but in the other there is a film of colour all over, lighter or darker of course. Now, allowance must always be made for this. For instance: if the film be blue a yellow laid on this will make a green; if the film be purple a yellow laid on would simply produce black; and this is the "reason why" many photographs are quite unsuitable for colouring as slides. The sky may be coloured because it has been painted out, but the rest of the picture, in many cases, cannot be coloured to nature. Moonlight is the favourite effect. After the slide is dry a sharp needle is used to pick out high lights on water or foliage, or to scratch out a moon. The albumen surface will be found well adapted for this purpose.

After the slide is dry look it carefully over and correct any blemishes which may appear; deepen the shadows where the picture is flat or wanting in force, and wipe out any parts which require to be lightened up. Great care is requisite in doing this, as it is very difficult to patch up a tint that has been broken. It is much easier to wipe out that part of the picture and paint it in over again.

The most important rule to remember in colouring slides is to have the colours bright, pure, and harmonious in their tints, and that the most brilliant effects are produced by a colour being placed next its complementary. The following will give an idea of the complementary colours to those who have not studied this subject:—There are three primary colours—red, blue, and yellow. Any two of these three mixed together is complementary, or harmonises with the third colour; and, also, any two shades of the same colour will harmonise—such as light blue with dark blue, light red with dark red, and so on. White or black harmonises with any colour.

Table of Complementary Colours.

Green is the complementary of red,
Orange ,, ,, ,, blue,
Purple ,, ,, ,, yellow,

and the reverse—

Red ,, ,, ,, green.
Blue ,, ,, ,, orange.
Yellow ,, ,, ,, purple.

The secondary colours all harmonise:—

Green is in harmony with either orange or purple,
Orange ,, ,, ,, green or purple,
Purple ,, ,, ,, green or orange.

Cautions to be Observed.

1. Do not work the colours about too much on the slide, as this "muddles" the tints; lay the colours on at once, commencing at the top of the part to be coloured, allowing the colour to follow the brush.

2. In wiping out any part which may not please, do not make the film too wet by having too much water in the brush, as the water is apt to run down on to the colour next to it. Do not keep it wet too long, as the film will swell and pucker up in wrinkles. In every case never attempt to lay on colour while the film is wet, but allow it to dry first.

3. In making corrections it is better and easier to allow the colour to dry before doing so.

4. In using the dabber do not be in a hurry or dab too hard, as more colour will be taken away than should be. Suppose the colour does dry, it can easily be remedied by breathing on the part required to soften the colour.

5. If the slide will not take on the breath, then it (the slide) is too warm, owing to the glass having become heated by the hand. Lay it aside for a short time in a cool place, or on the top of a cold iron plate, and go on with another slide during the time it is cooling.

This saves time; when quite cool the slide will take the breath quite freely.

6. Do not bring a slide near the fire at any time before it is varnished when colouring, as some of the colours are apt to split, more especially crimson lake and Italian pink.

7. If at any time a split should take place, take a clean brush and with water damp the glass underneath that part of the film which has curled up, and it will immediately go back to its place and show no sign of having split.

8. When the slide is finished do not heat it before varnishing, for the reasons already stated. Use ordinary negative varnish. If too thick thin it with a little methylated spirits of wine. Filter and pour the varnish on the slide, cold, in the same manner as coating a plate with collodion, but immediately it is coated put it close to the fire and it will dry with a high gloss, the slide appearing like a stained glass picture. Any defects which still appear in the picture may be touched out when the varnish is cold, but the slide must not be revarnished. The slide is now ready for remounting, which may be done by any of the boys or girls in the establishment.

THOMAS ROSS.

(To be concluded in our next.)

FOREIGN NOTES AND NEWS.

BLISTERS IN ALBUMENISED PAPER. — LIGHTING OF SITTERS BY SCREENS.—THE PHOTOGRAPHER ON THE FIELD OF WAR.

AMONGST the minor subjects ventilated in the last number of the *Photographisches Archiv* is blisters in albumenised paper. One correspondent says that washing the pictures in rain water immediately after removing them from the soda is almost certain to cause blisters. He makes his soda bath with hard water so strong that the pictures are fixed in about eight minutes, and adds ammonia until the solution feels slimy. After fixing he washes the pictures in spring water. Another correspondent—Herr A. Faassen, of Amsterdam—says that, though ammonia in the fixing bath is the surest preventative of blisters, yet it should be sparingly used, as it deprives the paper in some measure of its gloss. A third writer recommends the addition of spirits of wine to the fixing bath, in the proportion of three parts to five of hyposulphite of soda and fifty of water. A fourth—Herr A. Himsey—gets rid of blisters altogether by working in the following manner:—He allows brilliant paper to float for one minute, but no longer, upon a one to twelve silver bath containing a little alum and ammonia, and then exposes it for half-an-hour to ammoniac vapour. Before toning he washes the prints first in salt water until they become red, and then three times in clean water. His toning bath is a very dilute solution of gold with a little soda and borax, and it is allowed to stand for an hour before use. After being toned the prints are again dipped into salt water, and then fixed in a strong solution of soda. From the soda they are taken directly to a weak solution of alum, in which they are left half-an-hour. In both fixing and alum bath the pictures are kept in continual motion.

In a "leader" in the same journal Dr. Liesegang treats of the different methods of lighting glass-houses by means of curtains and movable screens. He mentions that in some glass-houses, instead of the side windows being darkened by one curtain white tissue-paper is pasted over the glass, and in front of that small curtains of from twenty to thirty centimètres in width are hung at intervals of twenty-five centimètres. The light is thus broken up, but the effect is said to be very agreeable. With regard to screens he says that it is now admitted that different effects can be produced at will by stretching yellow, blue, red, or white tissue-paper upon the screen-frames.

Some time since it was mentioned in these *Notes* that M. Klary, of Algiers, had introduced a method of lighting the sitter by means of screens arranged in a peculiar manner, which professes to be new, and for the right to use which system he charged the licensee a hundred francs. Without committing himself to any expression of opinion as to the novelty of M. Klary's system, of which he knows nothing, Dr. Liesegang expresses his approval of the beautiful results obtained by it as exemplified by a number of the cabinet portraits issued from that gentleman's studio. He is, indeed, strongly reminded by them of the works of the late Mr. Bingham, of Paris, which were entirely lighted by a system of screens. About the year 1860, when Dr. Liesegang visited it, Mr. Bingham's large glass-house, forty feet wide and proportionately high, served as little more than a shelter from the weather. The direct sunlight was excluded by ground-glass windows, and curtains were conspicuous by their absence; but a movable canopy was rolled forward upon wheels and placed over the sitter in order to soften the light, and the result was a portrait the softness of which was seldom equalled. In conclusion, Dr. Liesegang thought the marked success which attended lighting by screens in the two instances cited, as well as in the hands of many other photographers of whom no mention is made, should encourage others to renewed experiments in the same direction, which had already led to "Rembrants" and shadow portraits.

From the *Photographische Correspondenz* we learn that Captain Hannot, of the photographic section of the Belgian War Department, has lately published a pamphlet, *On Photography and Its Uses to Armies in the Field*, which is very favourably spoken of. Captain Hannot has the reputation of being "well up" in photographic matters generally, but especially in photolithography and photozincography, so that his *brochure* can scarcely fail to be interesting to those who take an interest in military matters, if not to the photographic public generally.

OPINIONS OF THE LONDON DAILY AND WEEKLY PRESS ON THE PHOTOGRAPHIC EXHIBITION.

THE PHOTOGRAPHIC SOCIETY.—This Society has again opened its annual exhibition at the Gallery of the Old Water-Colour Society, Pall-mall. The display is, as usual, highly interesting, though not so comprehensive as it might be; the contributions of given exhibitors are, in many cases, unnecessarily abundant, while, on the other hand, several leading practitioners still stand aloof from the Society. The main object of these exhibitions should be to bring forward new discoveries in photographic science, if any there be during the year, or to display for the instruction of the profession any newly-invented processes or appliances of photographic art. These, however, do not appear to be the objects of some exhibitors; on the contrary, they seem to care only to monopolise as much space as possible for wares that have no claim to novelty of interest. But we need not dwell on what is so obvious. From the evidence afforded by this exhibition we should conclude that nothing of really essential importance in regard to the actual chemical or optical progress of the art has been achieved this year, but that the applications of photography are constantly becoming more numerous and ingenious. Photography we have always with us now. We can have it as a witness, slave, servant, or friend, on our very clothes and dresses, on our wall-papers, on our tables, over-running our libraries, at home or abroad; there is hardly any situation of life in which it does not establish some relation with us. Yet it is always the same thing; it never surprises us by yielding the kind of delight that fine art affords. It is on account of this, as well as for other reasons, that we have always felt the futility of attempts to produce a "picture" in the full sense of the word (of course *minus* colour) by the combination of any photographic processes. A mechanical joining of two or more negatives can never be so satisfactory as the representation of one, for the reason that the two or more can never exactly correspond, and their discrepancy imports a falsity into the result which should not be chargeable to an art that of itself is veracious. Yet, apart from the false principle, a great deal of skill and taste may be displayed in the preparation of these nondescript "prints." The most prominent is not, however, the most successful example this year, viz., *Yes or No*—a sailor proposing to a fisher-girl, by Mr. Young; the sailor, having been posed separately, does not look at the girl, and various parts of the composition are sadly confused with each other. The aim at producing a "picture"—that is, to tell a story with a figure-composition, and by simple, direct means—is, of course, perfectly legitimate, and the following will illustrate the distinction we have pointed out:—*On Guard*—a dog caught lying awake beside a child sleeping in a cradle; the same subject with the mother leaving the child, by Mr. G. Nesbitt, and other subjects by this photographer. Examples of pictorial portrait groups by J. Chaffin and Sons may also be named:—*Checkmated*—ladies engaged over a game of chess; and *The Trio*—a gentleman and two ladies, musicians. We may also mention in this category *Water Lilies*, by A. Ford Smith—three ladies at a lake, with one stooping to gather the flowers. These photographs have some of the character of pictures—that is to say, in the sense that it is alone possible in photography; an attempt to go beyond this, and pretend to really rival fine art by patching together a number of necessarily discordant items of an imaginary incident, is as futile as it is illogical. There is a great deal, besides, in these exhibitions which must perforce be accepted or allowed, though it cannot be admitted as genuine. Such, for instance, as fancy painted backgrounds to portraits; skies, real or artificial, introduced to views too bright relatively to admit of their truthful introduction; and the "stippling" up of the flesh of portraits. This last is done to an extent never dreamt of when photography was in its innocent youth. It would be a good check upon this if the Society were to insist on the exhibition of at least one "untouched" print by all figure-photographers, so as to afford a test of the manipulator's ability; yet this would be almost impossible to carry out, for we suspect that some means of evading the test and meeting the requirements of the public

would be discovered. The portraits of M. Boucher and Messrs. Lombardi and Co. are obnoxious to our remark; but it is invidious to particularise, so common is the practice. The contributions of these photographers are, however, rich in effect and brilliantly lighted. These qualities are also conspicuous in the two groups by Chaffin and Sons, already named, and we should have added that they are remarkable as being the largest size photographs direct from life (without enlargement); that this is the case is evident from the strength of the contrasts. Continuing our search for artistic portraiture, we have two frames of *Studies*, with Arthurian titles, by Mrs. Cameron (mediately through the autotype process), which, as usual, are remarkable for dignity, beauty, and expressiveness, as well as for that breadth, softness, and suggestiveness of movement attainable by posing the figures a little "out of focus." Close to these are frames of children's portraits by R. Faulkner and Co., who are entirely unrivalled in this speciality. Taken by the instantaneous process, these photographs snatch from the little sitters a grace almost beyond the reach of art itself. It would be difficult to imagine anything more charming than this children's gallery. Not less delightful are some larger portraits of children on an opal ground, painted out from vignettes, and mounted print-fashion, so as to resemble mezzotint engravings, which they do closely, and, at the same time, suggesting (as evidently intended) child-portraits of Reynolds or Gainsborough. We specially commend to notice little *Winifred Peploe*, and *Dorothy Morison*. Other commendable portrait and figure works are by R. Slingsby, of Norwich; several frames with fancy backgrounds by W. and H. Fry—very delicately treated; the series of *Men of Mark*, from Messrs. Lock and Whitfield's negatives, produced by the Woodburytype process (which we have noticed on its monthly publication); *Pictures of Artists in Armour*, by R. Taylor, and others. The Autotype and Woodbury Companies compete with each other in the number of portrait enlargements they send. By the former there is a gigantic half-length of the Queen, and portraits, nearly as large, of various members of the Royal family. We confess we have little love for these necessarily much painted-over and inevitably-distorted productions. The Woodbury Company sends, besides portraits, copies of works of art, views of buildings, foreign sites of interest, and soforth. Many of the landscapes so nearly approach perfection in the delineation of the infinite delicacy, minutiæ, and beauty of nature that it is very hard to select for special eulogy. Nearly all the first hundred photographs are landscapes, and praise might be distributed to almost every one for clearness and sharpness, for tenderness or richness of tone, or for fulness and largeness of impression. Here, as in the figure department, the amateurs are in force. Mr. Crawshay, one of their number, who has always taken a prominent place in these exhibitions, and who formerly offered prizes for competition (which, by the way, are believed to have had the contrary effect to that intended), has quite an extensive collection of views, chiefly in Wales. These are admirable alike from the artistic and manipulative point of view; that is to say, they have a sense of composition and effect in the point of view chosen and a feeling for tone, while they are pure, clear, and crisp to a point that must satisfy the most exigeant operator. Colonel Stuart Wortley is another amateur of the highest attainments. He continues his studies of those effects of sky and sea which are most difficult in photography, and his triumphs are great—see particularly *Clouds*, with their silver lining, and *Desolate*, a stranded ship on a solitary shore under a sad sky. How wonderful is photography when it momentarily, yet for ever, catches the moonbeam at the cloud's edge, or the shimmer on weltering and breaking waves! Mr. William Bedford, son of the well-known Francis Bedford, exhibits several beautiful works which have a peculiar grey tone, produced by some process known only, we believe, to this very promising photographer himself. On the whole, however, we prefer the warmer tone of ordinary silver prints. The Royal Engineers and their officer, Captain Abney, the Rev. W. A. Atkins, and others enrich the collection with many views in Egypt, India, and other countries, which greatly enhances the interest and instructiveness of the gathering. In such views and in reproductions of works of art—of which there are also many examples here—photography is unrivalled. The exhibition will remain open until Nov. 14, and the 350 items it contains will well repay more than one visit.—*Illustrated London News.*

Photographic Society.—On the walls and screens of the Water-Colour Society's Gallery in Pall-mall are now arranged many hundreds of photographs fully and fairly exemplifying the present marvellously advanced, if not yet absolutely perfected, state of the heliographic art. If from the list of exhibitors a few absences of note have to be regretted, there is ample compensation in the excellence achieved by many of the seventy artists and amateurs who contribute this year to the Photographic Society's exhibition. Missing, as we do, any manifestations of the peculiar and characteristic skill of the president, Mr. Glaisher, and of such usually active vice-presidents and members of council as Mr. Valentine Blanchard, Professor Stokes, Dr. Diamond, Mr. Francis Bedford, and Mr. Jabez Hughes, we are the less inclined to lament the lack of specially scientific subjects—in which category, indeed, the present collection is wholly deficient—when we see so magnificent an array of portraiture as that which has been furnished by Messrs. Lombardi and Co., of Pall-mall and Brighton, the Woodbury and Autotype Companies, Mr. John Spiller, and other representatives of the highest artistic grade in photography. Colonel H. Stuart Wortley scarcely comes under the same class this year, his picturesque studies of heads and figures being in a minority as compared with his successful triumphs over the difficulties of light, shadow, and fluctuating motion in external nature. Among the most important contributions are those of the firm at whose head stands Mr. Lombardi, and who, as the successors of Messrs. Caldesi and Company, worthily support the reputation of an establishment distinguished by its services in the dissemination of high art. Under the names of Lombardi and Co. are no fewer than nineteen entries, chiefly relating to portraits of life-size, but also inclusive of cabinet and smaller specimens, in a Rembrandtesque style, many of which, grouped in one frame, are counted as a single contribution. In this manner the firm really exhibits a collection of likenesses numbering more nearly 100 than a score; in addition to which there is a large photographic view of Northumberland House, taken shortly before its demolition by order of the Duke of Northumberland. The most striking works of Mr. Lombardi, however, are his life-size portraits, being carbon enlargements from photographs of remarkable *vraisemblance.* The head of the late Mr. Brassey, the engineer, finished in crayons; likenesses on porcelain of Mr. Gladstone, M.P., and other well-known personages; copies in carbon photography of portrait-paintings by Sandys and Buckner; direct photographs, pictorially treated; and three frames containing a remarkable series of small portraits, wonderful for the management of their chiaroscura, make up the tale of Messrs. Lombardi and Co.'s specimens. The Autotype Company shows life-size portraits of the Queen, the Princess of Wales, Prince Albert Victor, Princess Louise Victoria, the Crown Prince and Princess of Germany, the Princess Frederika Karl, and Count von Moltke. Some of these and other likenesses, by the same exhibitors, are from negatives by Reichart and Lindner, of Berlin, and by W. and D. Downey, of London and Newcastle; but the most important work of the Autotype Company, photographically considered, is an artistic portrait of a lady, the negative being by Vogelsang, of Berlin, which will be seen on the same end wall of the gallery with the liknesses of the Queen and Princess of Wales. The Woodbury Company is likewise prolific in portraiture, its most notable contributions, from negatives by Messrs. Lock and Whitfield, being heads of Cardinal Manning, Sir Garnet Wolseley, Lord Lytton, Lord Dufferin, Mr. Bright, Mr. Millais, Sir John Huddleston, and Sir Bartle Frere, some enlarged to the size of life, and others being unaltered reproductions from the series, *Men of Mark.* Mr. Robert Crawshay, of Cyfartha Castle, one of the most indefatigable of amateurs, contributes some five-and-twenty outdoor scenes, interesting as to their subjects and admirable in all points of treatment. Captain Abney, besides having supplied the negatives of Eastern scenes, enlarged by the Woodbury Company, shows some excellent pictures on his own account, as well as in conjunction with the most skilful of his photographing staff in the Royal Engineers. There are in this exhibition a few favourable specimens of the Lambertype process—a very suggestive series of old and new homes in the Vale of Aylesbury, by Mr. S. G. Payne, showing that modern architecture can be picturesque as well as habitable when it tries; a sprinkling of pleasant landscape subjects by Mr. W. Bedford; a set of instantaneous portraits of children, catching the momentary expression with marvellous fidelity; a few charmingly perfect and delicate photographs, by Mr. F. Hollyer, from pictures by Mr. Val Prinsep, Mr. Pettie, R.A., and other painters; several very attractive works by Mr. A. Boucher; and, among the objects on the table in the centre of the gallery, a noteworthy series of lantern transparencies, by Mr. F. York.—*Daily Telegraph.*

ENGLISH PHOTOGRAPHS AT THE PHILADELPHIA EXHIBITION.

After a long notice of the American and Continental photographs at the Centennial Exhibition, the *Philadelphia Photographer* concludes by some observations on the works of English artists :—

Mr. R. Slingsby, Lincoln, has a few choice portraits in large size, showing excellent work; Mrs. Julia Margaret Cameron, of Lindula, Ceylon, character portraits (the author of these has expressed more of sentiment than of photographic or artistic skill); Mr. Robert Crawshay, Wales, some pretty landscapes; Mr. Frederick York, London, stereoscopic views of scenery, architecture, interiors, zoological, &c., and some 6 x 8 and cabinet sizes, all excellent; Mr. Adolphe Beau, London, examples of the heliotechnic process.

On the wall, Alcove 28, Messrs. H. P. Robinson and Cherrill, Tunbridge Wells, have portraits, landscapes, and character pictures, mostly produced by combination printing. We are disappointed here, as in some other of the foreign exhibits, in seeing nothing new. These have all been exhibited before, and their merit and novelty to American photographers is an old story. Mr. Frank Good, Hartley Wintney, makes a fine display of his views in Holy Land and Syria; they are in stereoscopic and 8 x 10 sizes. Mr. W. Hanson, Leeds, has a frame of neat card and cabinet portraits, and two large heads, finely done; and directly underneath these are the wonderful landscapes by Mr. Payne Jennings, Dublin. In these nine 10 x 12 photographs Mr. Jennings has excelled our most ardent conceptions of what might be produced by

pure, simple photography. Here are the most charming compositions, the most enchanting perspective, the tenderest skies, all full of feeling, life, and beauty, and executed on one plate with an effect and perfection that we have seldom, if ever, seen equalled. The beauty of the work is much enhanced by being mounted with gelatine on plate glass.

Screen 28 has some successful photographs of animals by Mr. David Hedges, Lytham, and fine large landscapes by Mr. F. Hudson, Ventor. A large collection of card and cabinet portraits, all excellent work, of actresses, operatic, scientific, and literary celebrities, ambassadors and ministers, clerical dignitaries, members of the House of Commons, the Disraeli and Gladstone ministries, and distinguished men, the whole forming an exhibit that is a credit to the London Stereoscopic Company, by whom the work was executed. Messrs. A. and J. Bool have also some large landscapes well done.

The inner wall of Screen 28 has landscapes and interiors, by M. Davanne; also portraits by Messrs. Hugo Thiele, R. Crawshay, Valentine Blanchard, W. England, and R. Slingsby, some of them being fine in lighting and composition.

The west side of Screen 28 contains a magnificent display of mammoth landscapes by Mr. Vernon Heath. Two of these are about two feet by three in size, and all are as perfectly executed, as far as the movements of foliage and all the finer effects are concerned, as the smallest stereo. We are almost as much puzzled before these pictures as when confronted by Mr. Kent's portraits, but here we have no intimation of direct negatives, while a friend at our elbow suggests "enlargements," and upon turning to the catalogue, we read "landscape studies, enlarged and printed in carbon." This settles the question, and we are filled with admiration for the process by which such work can be produced, and feel thankful to Mr. Heath for exhibiting these beautiful examples.

Alcove 29, south wall, large portraits and marine views with coloured effects, by Col. Stuart Wortley; several fine Scotch views without name; Mr. Carl Norman, Tunbridge Wells, landscapes, architectural and interior views—all excellent work.

Mr. W. England, south-west wall, landscapes and sculpture. Mr. William Bedford has quite a large collection of rather pretty landscapes of about 10 × 12 size, mostly English scenery. In the west window, Mr. F. York, London, exhibits lantern transparencies. Mr. C. P. Lee, Cardiff, coloured enamels; rather pretty but a little exaggerated in colouring. Mr. A. L. Henderson, vitrified enamels, plain and coloured—quite successful. Fradelle and Marshall, London, cards and 8 × 10—good work. Mr. J. Barnard, Bedford, exhibits portraits and architectural views by the chromotype process. Unless this process finds some more successful worker than Mr. Barnard we fear its permanence will not save it. That same over-done appearance exists in these which characterises nearly all the work we have seen by this process. Mr. F. Baum, Manchester, has a couple of carbon portraits, but he has evidently not attained to the highest success in working the process. This space closes with some Scotch scenes, contributed by Messrs. Wilson, Hood and Co., to show the working of Ross's new symmetrical lens. On the table in this alcove are several books of architectural photographs, by Messrs. Bedford, Lemere and Co., London. Mr. G. W. Wilson, Aberdeen, a fine collection of his beautiful Scotch scenery, in book form. They are well worth a perusal. Mr. Wilson has also a stereoscope box of transparencies which are very fine, and attract a great deal of attention. Thus endeth the circuit of Photographic Hall.

Meetings of Societies.

BERLIN PHOTOGRAPHIC SOCIETY.

At the second June meeting of this Society, which was the last of the session, Herr Prümm again took the chair in the absence of Dr. Vogel.

The Chairman read a letter from Herr Salingré, in which he gave an account of the treatment he met with at the hands of the police for leaving his show-case uncovered on Sundays. He was first fined; but on representing to a higher official that the goods in the show-case were not for sale, but merely specimens of his work, his plea was accepted. The matter was, however, carried before the highest court of appeal, and he was finally condemned in costs and fined two thalers.

A letter from Herr Richter gave rise to a prolonged discussion on the cause of clear spots in albumenised prints, two specimens of which accompanied the letter. These spots were of frequent occurrence in the prints he made during the latter half of the year 1873, but, fortunately, he had not been troubled by them either before or since. As neither the unmounted pictures nor those of larger size printed during the same period showed any trace of this flaw he was inclined to think that the printed mounts should bear the blame. That the spots were not caused by the particles of bronzing on the mounts was proved, he thought, by the specimen, extra prints mounted on such mounts not being faulty in this respect. So, assuming the fault to be caused by soda in the mounts, he appealed to the Society to petition the manufacturers not to use soda and chlorine in the manufacture of articles for photographic purposes.

In spite of Herr Richter's experiments the opinion was pretty generally expressed that the fault was not unlikely to be caused by the bronze. As a foundation for this conclusion,

Herr Roloff showed a picture which he had pasted upon a mount with bronze lines, so that the lines were covered. About six months after the silver was dislodged above the bronze, and its situation on the mount was distinctly indicated by a clear line round the picture.

Herr Junghans showed, in a convincing speech, that there was great danger to pictures from the mounts as well as from the bronze. The pasteboard was generally made of the worst materials, various chemicals being employed to give it a good appearance, and it was evident that the bleaching medium had often a deteriorating effect upon the pictures. With respect to the bronzes, their composition was so various that the unfavourable action must be now higher and now lower in degree. They were generally made from alloys of copper, zinc, or other base metals, which were also frequently boiled with salts or acids in order to give the resulting bronze a certain colour. These bronzes may be dangerous to the photographs in two ways, especially in a damp condition—by the action of the metals and by the free salts and acids. In his opinion there was no such thing as a perfectly-harmless imitation bronze; but the least harmless amongst them was prepared from stannic sulphide.

Dr. Weissenborn related an instance when a whole lot of mounts—part plain and part bronzed—were returned to him with the remark that all the pictures pasted upon them, even upon those that were not bronzed, soon became spotty, and some specimens were sent on to him. He had pasted pictures on some of them, but had got no spots.

Herr Roloff was of opinion that, in the case before them, the paste was at fault.

Dr. Weissenborn reminded them that the addition of five grammes of alcohol and ten drops of carbolic acid to one pound of paste would generally prevent the latter from becoming sour for a reasonable time.

The Chairman mentioned a case in which a number of prints were spoilt by being left for two days between sheets of damp blotting-paper, white spots showing in great numbers, especially above the knots in the paste.

The continuation of Herr Richter's letter was then read, in which he said that for the last four years he had used a mixture of salts in his collodion corresponding to the double salts recommended by Dr. Eder. The salts were so durable that reddening of the collodion was an almost forgotten thing, even with a temperature of 25° R. and a storage of twelve months.

Some time ago it was resolved to present to Dr. Hornig, the President of the Photographic Society of Vienna, a large album, containing the portraits of all the members of the Berlin Photographic Society. The task of getting it up having been confided to Herren Marowsky, Schaarwächter, and Oldenburg, these gentlemen placed the finished album on the table to receive the signatures. The album is intended to hold 222 portraits—some *carte* size and some cabinet—but one or two portraits are still wanting.

A number of French pictures were then handed round for examination. They were enamelled, generally printed oval, and were surrounded by a plain or ornamental oblong border. Some of these oblongs were marbled like a sheet of tin upon which an acid had been allowed to act, and others were of a running pattern. They were printed from special negatives transferred from the glass to a sheet of gelatine.

A number of newly-invented photometers were then described. First there was that of Herr Furrer, constructed on the same principle as Dr. Vogel's, the tissue-paper being replaced by ground glass, and the black numbers by a series of medallion portrait negatives. Then followed the description of a graduated scale prepared by Herr Von Sternfeld for the foregoing photometer. It is prepared in exactly the same way as Herr Geldmacher's scale, which has been already described, the albumenised paper of the latter being replaced by carbon tissue.

Herr Schaarwächter referred to a photometer made by Herr Peters, of Brussels. A piece of sensitive albumenised paper is covered by a sheet of metal, in which there is an opening that may be enlarged by being pushed forward. The metal is painted to resemble photographic colouring. The light is allowed to act on the sensitive paper through the opening, until the tone of the metal has been reached. This is one printing degree. The opening is then enlarged a certain distance, and the light allowed to act until the freshly-exposed paper has also reached the tint of the metal. This process is continued until the desired number of degrees has been got.

Dr. Weissenborn recommended white blotting-paper as better than unalbumenised paper for the bichromated strips of paper usually used with Dr. Vogel's photometer, because the first-mentioned paper takes on the colour more intensely and shows the numbers more distinctly than the latter.

Dr. Fritsch spoke of an article in which Dr. Stein's method of photographing the waves of sound was described, and he concluded by exhibiting a sphygmograph.

The Chairman showed a pair of enlargements made by the solar camera upon albumenised paper, which were pronounced to be little, if at all, inferior to any carbon enlargements that had been seen in Berlin. He (the Chairman) spoke at some length on the advantages and disadvantages of this method of enlarging. A great advantage, he said, was that neither a transparency nor an enlarged negative was required, and that the silver process was simpler and required less retouching than

the carbon. On the other hand, it was very dependent on the weather; but with the present appliances it was apparently impossible to produce carbon pictures in this manner. Besides, several negatives are required, as they must be so thin and transparent that they are useless for the ordinary printing process. The preparation of these negatives offered many difficulties, as they were often, when developed, found to be already too intense and opaque. The rather hard appearance of one of the pictures shown was caused by a somewhat too intense negative. He (the Chairman) had long sought unsuccessfully for a means of weakening such negatives, but Herr Schulz had communicated a process which seemed to answer the purpose:—Dissolve some iodine in alcohol or, better still, in an aqueous solution of iodide of potassium; add cyanide of potassium until the fluid becomes colourless; pour over the negative until the required degree of transparency is secured. This plan works well with unintensified negatives, but for those which are intensified it is less useful, as it easily becomes cloudy-looking.

Dr. Fritsch asked the reason of the frequent appearance of a granular structure in his carbon prints.

The Chairman thought the direct cause was the present excessive heat, and recommended that the chromate and all cold baths should be kept cool by means of ice. He then showed some intentionally over-printed carbon pictures, which had exactly the appearance of a piece of shagreen paper, the picture, only traceable by the grain of the shagreen, being finer or coarser according to the shading.

The treasurer's and auditor's accounts for the year 1875-6 were looked over and passed, after which the meeting was adjourned, and will not meet again until after the holidays.

Correspondence.

BRICE'S PATENT CAMERA.

To the Editors.

Gentlemen,—The "Peripatetic Photographer," in an article in the number of the 1st instant, draws a parallel between Newton's old dipping camera and my new one, which is on an altogether different principle, lately described and illustrated in your issue of August 11th.

To draw the point of distinctions as to the respective merits of the two systems would entail too much space. I can only say that I possess the two species of apparatus mentioned—nay, more, the Newton's is on a much improved principle contrived by myself, but notwithstanding, for portability, measuring for a $3\frac{1}{4} \times 3$ plate only $10 \times 10 \times 5\frac{1}{2}$, convenience in being quickly got ready to work, facility of manipulation (the whole being reduced, as our Editors have stated, to the pulling of a few cords or, rather, leathers), perfection in results, and, lastly, but not least, cleanliness of hands and everything about one, including carpets, I most decidedly prefer my own camera and always use it in preference to the other.

I have three—one for $2\frac{1}{4} \times 3\frac{1}{4}$, measuring under twelve cubic inches; one large one for plates $5 \times 7\frac{1}{2}$, measuring $15 \times 14 \times 8\frac{1}{2}$; and, lastly, my pet one, lately made for me by Mr. Hare, which is a perfection in all points. It is for plates $3\frac{1}{4} \times 3$, measures $10 \times 10 \times 5\frac{1}{2}$ and weighs four pounds. It is admirably adapted also for all sorts of experiments, scientific and others, and particularly for use for the microscope, as this has only to be placed underneath—say under a pierced box or stool—whilst the image is received through the bottom of the camera by lowering the plate to the horizontal position it occupied during sensitising. More than this: the tray, having, if desired, a plate-glass bottom, the image can be taken whilst actually in the bath, thus securing the utmost sensitiveness, fineness of deposit, and cleanliness for microscopic or spectroscopic operations; and being horizontal the use of an ammonio-cupric solution, likewise horizontally placed anywhere on the passage of the light rays, ensures almost absolute coincidence of the visual and actinic foci. It would also be a curious experiment to ascertain whether the image could be obtained more perfectly in the case of the light being allowed to act on the film whilst in the silver or whilst in the developing bath. Such an experiment has been tried with pyrogallic acid, why not with iron?

In conclusion: if the "Peripatetic Photographer" or any amateur be sufficiently interested in the matter to wish for further particulars, and come and see me any morning from ten to eleven, I shall be most happy to show him both the systems of camera most perfectly executed, though I fear the Newton's, from disuse, is not in working order.—I am, yours, &c., W. A. Brice.

56, *Torrington-square, September* 19, 1876.

PHOTOGRAPHY AT THE BRITISH ASSOCIATION MEETING.

To the Editors.

Gentlemen,—We observe in your issue of the 15th inst. a notice of the Photographic Exhibition in connection with the meeting of the British Association at Glasgow. With reference to your remark about the want of names on some of the specimens, will you kindly allow us to offer the following explanation?

Having been asked to contribute specimens we had them ready to send in, when we received a note from Mr. John Jex Long, requesting us to put our initials and a private number on the back of each case. As this looked as if no name was to be attached we asked an explanation, and were informed by Mr. Long that *we could not be allowed to put our name in front, as the exhibition was for purely scientific purposes, and not for a trade advertisement.* How other people were allowed to put their names in front we do not know; but that is how our specimens came to be nameless. We may further remark that the exhibition is not open to the public with the others, as you state, as the pictures had all to be removed on Friday last. Hoping you will find space for this in your next issue,—We are, yours, &c., Chambers and Sellars.

85, *Buchanan-street, Glasgow,*
September 18, 1876.

P.S.—The exhibitors had no opportunity of viewing the exhibition except by becoming members of the Association.—C. and S.

[With reference to the above, we have to state that in order to ascertain the names of the various artists we took the liberty, in several instances, of unfastening the nails by which the photographs were fixed to the walls; but this was inexpedient or impossible in every case. In addition to our present correspondents we learn that Mr. A. Robertson was also an exhibitor.—Eds.]

A REMINISCENCE OF THE PHOTOGRAPHIC EXHIBITION.

To the Editors.

Gentlemen,—When I have had the opportunity of visiting the Photographic Exhibition I have always regretted that I have not been able to carry away with me something more lasting than the mere memory of the many good pictures to be seen there.

I would, therefore, now suggest that the Committee have the walls of the Exhibition photographed—say whole-plate size—from two or three good points of sight. I have no doubt there would be a good sale for them at about one shilling each; not only so, but it would be a boon to the many photographers at a distance who are unable to see the exhibition, and would give them a very good idea of the pictures.—I am, yours, &c., O. C. Smith.

Stroud, September 13, 1876.

Emulsion Photography in America.—We have a vivid recollection of the time, not so long since, when our Philadelphia contemporary appeared to think that in giving so much countenance to emulsion photography as we did, this Journal was scarcely acting a wise part. But, "seeing is believing;" and our contemporary now attributes to this method of photographing the same importance we have always done; for, in course of some observations upon prints from emulsion negatives by Mr. H. J. Newton, he observes:—"Here are beautiful pictures possessing all the qualities of the best photographs by any process executed 'without the silver bath.' When we see such work as this produced by such means we are almost ready to conclude that we are on the eve of a new era in photography. Soon the negative bath will be known no more, with its eccentricities and obstreperous fluctuations, but the photographer will take in his pocket a bottle containing bath, collodion, and all, and go forth untrammelled to woo and capture the beauties of nature. Mr. Newton has certainly demonstrated wonderful progress in this direction, and from so intelligent and zealous a worker as he we shall expect greater triumphs in the future. The portraits by the same process are not less successful than the views."

EXCHANGE COLUMN.

No charge is made for inserting these announcements; but in no case do we insert any article merely *offered for sale*, that being done at a small cost in our advertising pages. This portion of our columns is devoted to exchanges only. It is imperative that the name of the person proposing the exchange be given (although not necessarily for publication, if a *nom de plume* be thought desirable), otherwise the notice will not appear.

Wanted, a front combination for a Grubb's B aplanatic view lens. In exchange is offered a Weston's *carte-de-visite* burnisher.—Address, Wright Brothers, 57, Gold-street, Northampton.

Wanted, a large portrait lens, in exchange for a 10×12 achromatic doublet by Ross, and Kinnear camera, cost £20.—Address, T. Clarke, photographer, Weymouth.

I will exchange a copy of *The Magic Lantern* for Captain Abney's *Instructions in Photography* and the fifth edition of the *Autotype Manual.*—Address, J. C. Burrow, Camborne.

A good square half-plate mahogany camera, by Mason, half-plate lens, by Lerebours, and a new card lens, will be given for a good half-plate Kinnear camera and view lens by any good maker, or for a good rolling-press. Difference in cash.—Address, James Edwards, Brora, Sutherland, N.B.

ANSWERS TO CORRESPONDENTS.

☞ *Correspondents should never write on both sides of the paper.*

PHOTOGRAPHS REGISTERED—

John Usher, Ramsgate—*Portrait of the Rev. J. D. Rodway.*

George H. Buckman, Dover—*Five Photographs of Stott's Aërial Machine.*

E. W. Dallas, Edinburgh—*View of the Inauguration of the Albert Memorial.*

A. G. Massey, Armagh—*View of Demonstration at Col. Lloyd's, Ballyleck, Monaghan.*

John Horsburgh, Edinburgh—*View of the Inauguration Ceremonial of the Prince Consort Memorial.*

Webster and Son, Chester—*Two Groups of the Hon. W. E. Gladstone, M.P., and Family; Group of W. H. Gladstone, M.P., and Wife; Portrait of W. H. Gladstone, M.P.; and Portrait of the Hon. W. E. Gladstone, M.P.*

NOTICE.—Each correspondent is required to enclose his name and address although not necessarily for publication. Communications may, when thought desirable, appear under a *nom de plume* as hitherto, or, by preference under three letters of the alphabet. Such signatures as "Constant Reader," "Subscriber," &c., should be avoided. Correspondents not conforming to this rule will therefore understand the reason for the omission of their communications.

⁂ We hope next week to overtake most of our arrears of correspondence and reviews, amongst the latter of which are included M. Leon Vidal's polychromes (which may now be seen at our office); the *Scenograph, and Scenograph Views*, by Mr. Woodbury; landscapes in carbon, by M. Harrison (of Asnières); trade catalogues, by Messrs. Geo. Mason and Co.; *Hafed*, by Mr. D. Duguid; and others.

J. T. P.—"Mr. Frith, Reigate," will prove a sufficient address.

ED. COWPER.—The lens you describe belongs to a class very common indeed.

A. R. G.—We are unable to indicate the cause of the mottling of the film in your case.

B. S.—The paper is filled with metallic spots. They appear to be in the albumen.

TYCHO.—The prints marked "C" are excellent; those marked "B" are very bad indeed.

ALEXR. BARNARD.—The preparation of the sample of paper enclosed is at present a trade secret; but we have published in this Journal everything requisite for you to know in that direction.

H. G. G. (Belfast).—Apply to the Autotype Company, or to Messrs. B. J. Edwards and Co. The specimen you enclose is not equal to what is done by practitioners in this country. For further particulars send addressed envelope.

H. T.—There is no way by which the quality of a photographic lens can be ascertained but by an examination of the image formed by its agency. There is no difference between the makers named; they both produce articles of the first quality only.

A. B.—It is probable that any other of the brown pigments will answer the purpose equally well. By informing the colour merchant for what purpose the pigment is wanted he will be able to supply you with a suitable kind. Try brown ochre.

CHARLES (Bampton).—Our regulation is one of great simplicity, and ought to be well understood by our readers. It is to this effect—that we decline to answer any query whatever from a correspondent of whose name and address we are kept in ignorance.

C. M.—We are unacquainted with the details of the mechanism of Mr. Skaife's pistolgraph. It was of such use that its introducer was enabled by its agency to obtain small photographs in a very brief space of time. Dry plates will answer for producing enlargements.

J. HARDY.—The preparation of your plates is all right. Where you have failed is in the developing, for you will never be able to obtain an image upon a bromised film by applying an acid iron developer in the way you have been doing. When we applied an alkaline pyro. developer to the plate which you had exposed we found that the image flashed out with such rapidity as to be unmanageable, so much was it over-exposed.

M. O'CONNOR.—1. We have not yet received the samples of wood from the cabinet-maker to whom they were submitted for his opinion.—2. The brass must be well polished, after which it must be warmed and lacquered.—3. A solution of shellac in alcohol.—4. The lens will work with great rapidity; but, in these days of cheap and portable camera-stands, we do not advise you to use a lens by holding it in the hand during exposure.

E. SMITH.—There are two methods of producing an enlarged picture on canvas which we recommend in preference to others. The former of these is the carbon process pure and simple, the latter being the "dusting-on" method, a formula for which will be found in our last ALMANAC. There is a third method by which we have seen some good results produced. It consists in making an enlarged transparency upon glass by the wet collodion process, and then transferring the film from the glass to the canvas.

EPSOM SALTS.—A correspondent who adopts this whimsical *nom de plume* describes his experience with the method for effecting the removal of hyposulphite of soda from prints, which we published three weeks ago. He says:—"I put one ounce of the best commercial sugar of lead in eight ounces of hot water, which became quite milky. After becoming clear in the course of a day or two I put one ounce to two quarts of water. After the prints were toned and fixed (some sixty *cartes)* I washed them in three changes of water, and immersed them for a couple of minutes. The whites were much improved, also the tone. *I did not notice any milkiness when put into the lead solution.* After taking them out I washed in three changes of water. Do you think they will stand? It is just the thing if they will. I may add that the sugar of lead is in powder, but sparkles very much like refined sugar."——In reply: We see no reason why these prints should not be as permanent as those by Mr. Viles.

A. MARSHALL (Boston).—In a letter received from Mr. Marshall he says that he has tried substituting sulphuric acid for ammonia for carbon printing, as we lately recommended, and has found it to be a great improvement. Some special transparency paper that would not work at all with ammonia in the sensitising bath works well with the acid.

REV. ALBERT JENKIN.—The effect desired can be obtained by removing the print from the toning bath before the action has gone quite so far; but there is paper to be procured by which it is difficult to obtain other than a warm tone like that of the *carte* enclosed. With regard to the negative, hardness is usually the result of an insufficient degree of exposure; but there are some kinds of collodion of so intense a nature as to yield hard pictures under almost all conditions of lighting and exposure, and to this belongs, we imagine, the sample you are using.

S. S.—1. Nicol's prisms may be obtained from any of the opticians advertising in this Journal. One of somewhat large dimensions will be required for your lantern. Your townsman, the Rev. W. Whiting, is able to give you excellent advice in this matter, and, from what we know of that gentleman, we feel certain that it would afford him pleasure to do so.—2. At present we are unable to supply an answer to this question.—3. We published an account of Birrell's patent oxyhydrogen apparatus a few months ago. See our notices of *Recently-Patented Inventions* in the present volume. Some remarks upon this subject will also be found in an article in this number.

A. NOEL.—We fear the kind of paper you desire is not to be obtained in commerce—at least in this country. What is required is a surface of such a close nature as to prevent the silver solution from sinking deeply into the substance of the paper. A salting solution containing gelatine has been successfully employed in the preparation of a matt surface. The following formula has been recommended:—

Chloride of sodium	40 grains.
Chloride of ammonium	60 ,,
Citrate of sodium	100 ,,
Gelatine	10 ,,
Water	10 ounces.

The gelatine is first dissolved in warm water, and the solution added to the other ingredients, which must have been previously dissolved in a portion of the water. The preparation of paper with resin has also been recommended. The following is Glover's formula for this purpose:—

Gum thus	180 grains.
Gum mastic	40 ,,
Chloride of zinc	200 ,,
Alcohol	8 ounces.
Ether	2 ,,

The ether acts as a rapid solvent of the mastic. The paper must be immersed for five minutes, and be thoroughly dried before being sensitised.

RECEIVED.—*York's Photographs of South Kensington Museum*, Part II. The present number is quite equal to the former one, which is saying very much. It contains four charming Woodburytypes with descriptive letterpress, and is a perfect marvel of cheapness.

BRISTOL PHOTOGRAPHIC ASSOCIATION.—We have received the following, which we publish on behalf of those whom it may concern:—It having been thought desirable to much increase the Bristol Amateur Photographic Association, the intention is to make it not only a Bristol but a West of England society generally. It is therefore confidently hoped that a large number of gentlemen will become members who would not otherwise have done so, thereby making it one of the largest and most important of societies. As the winter session is now at hand all gentlemen wishing to be enrolled are requested to send in their names, *as early as possible*, to the undersigned, who will afterwards call a meeting to elect officers and draw up rules for the intended new basis of the Association.—H. A. H. Daniel, 49, Broad-street, Bristol.

LONDON GAZETTE, *Tuesday, September* 19, 1876.

PETITION FOR LIQUIDATION BY ARRANGEMENT.

R. PATESON, Preston, photographer.

METEOROLOGICAL REPORT,

For the Week ending September 20, 1876.

Observations taken at 406, Strand, by J. H. STEWARD, Optician.

THESE OBSERVATIONS ARE TAKEN AT 8 A.M.

Sept.	Bar.	Wind.	Wet Bulb.	Dry Bulb.	Max. Tem.	Min. Tem.	Remarks
14	29·79	N	51	54	63	50	Cloudy
15	29·80	NW	50	52	65	49	Foggy
16	29·68	SE	53	54	63	48	Raining
18	29·89	W	55	59	68	50	Cloudy
19	30·26	W	53	55	68	50	Foggy
20	30·40	NW	52	54	67	49	Foggy

CONTENTS.

THE BRITISH JOURNAL OF PHOTOGRAPHY.

No. 856. Vol. XXIII.—SEPTEMBER 29, 1876.

VIDAL'S POLYCHROMES.

By the kindness of M. Leon Vidal we are at length placed in a position to examine minutely specimens of his polychromatic photographs, and not only so, but to extend the same privilege to such of our readers as choose to avail themselves of it; for on application these specimens may be seen by any person calling at our Publishing Office.

It was at the Bradford meeting of the British Association the subject of photopolychromy, as invented and practised by M. Leon Vidal, was first brought before the notice of the British public generally. Photographers had some time prior to that meeting been made aware of the conception and development of this branch of art through communications in The British Journal of Photography; but with the exception of the few experimental scraps by which that paper had been illustrated we have not had till now any opportunity of seeing photographic works finished according to this method.

Before commencing to describe M. Vidal's process we may observe, negatively, that he does not profess to have solved the problem of producing photographs in natural colours, but only to have devised a method of producing coloured photographs; and, although the latter may to a cursory reader appear to be the same thing, they are in reality very different. By the former of these we mean the preparation of a sensitive surface in such a way and by means of such chemicals as to ensure the reds, yellows, and blues of nature reproducing themselves respectively as red, yellow, or blue upon the plate or paper, owing to the peculiar action of the coloured rays upon the sensitive chemicals. This it is which constitutes photography in natural colours.

Unless M. Vidal has made a departure from the principle adopted by him when he first introduced his ingenious system of photopolychromy, a very good idea of that system may be obtained from the observations which follow.

Based upon the carbon printing process photopolychromy resembles chromolithography in principle. In a chromolithograph every different tint implies a separate print, the colouring matter of which is transferred to the sheet upon which the finished picture is finally impressed. So it is in photochromy: every colour that is to be printed implies a separate print, and each print in turn implies a separate negative, from which every portion has been stopped out except that which has to yield a certain colour. Thus according to the number of colours in the picture must be the number of negatives. For example: if the subject to be photographed be a web of tartan composed of three colours—red, blue, and yellow—three negatives would have to be taken, and from the first every part *except that which is to be printed red* must be stopped out with opaque black varnish, and the same course would have to be adopted with respect to the other two. Here, then, we have got three negatives no portion in any one of which will be found to exist in either of the other two.

The negatives being ready we next turn our attention to the method of using them. Three sheets of sensitised pigmented paper must have been obtained, one being of each of the colours required. They are, in short, carbon tissue without the carbon, the pure pigments—yellow, blue, and red—only being present, and of these one only in each sheet. These are printed in the ordinary manner, the red tissue being printed upon by the negative from which was stopped out all the portions requiring to be printed in red, and the same with the yellow and blue sheets and their corresponding negatives. Each picture, when finished, has thus only a portion of the pattern impressed upon it. But the paper is thin and transparent, and the colouring matter readily "sets off" upon another sheet which forms its permanent abiding place. The first portion of the picture is laid down upon this final support, and by sponging the back with alcohol the image leaves the transparent impressed paper and adheres to the other sheet. The second picture is next laid down in a similar manner, and, owing to the temporary support being transparent, correct registration is easily secured by moving the picture a little to one side or the other. The same is done with the third transparency; and the complete picture will thus contain every portion of the subject. The mixture of colours may be practised to any extent; thus, if green were to be printed the corresponding part would be stopped out from the red print negative only, by which the yellow and blue printed by the other two negatives would be superposed, producing green.

We are unaware whether or not M. Vidal has recently modified his process; but we believe we are correct in stating that the method of which we have given an outline explains the principle.

The specimens we have received from M. Vidal are exceedingly fine and brilliant, two portraits among them presenting all the appearance of elaborately-finished paintings, in which, however, it is impossible to see any trace of a stipple. In addition to these there is a picture of a vase containing flowers possessing great richness of colour, also of a pair of dogs, and examples of art-treasures from the Louvre.

EMULSION PLATES AND IRON DEVELOPMENT.

We last week spoke of the advantages to be derived, under certain circumstances, by the substitution of pyrogallic acid and silver for the more generally-used mode of development by the alkaline method, and this week it is our intention to deal with the subject of iron development as applied to washed emulsion plates. The pyro. and silver method is well known to be capable of giving most excellent results with emulsion, or, indeed, any description of dry plates; but hitherto iron in any form has not proved itself able to compete in the same line, and, it is probable, will never attain to an equal state of perfection as regards result. This may be owing in a certain degree to the latter plan not having been sufficiently studied, for, although for wet-plate work it is *the* method *par excellence*, it has been rarely used or recommended in connection with dry plates; yet, as we have remarked on previous occasions, there exists a class of photographers who would look much more favourably upon various dry processes if the method of development to which they have been accustomed in

the course of their wet-plate work were only applicable. It is in the interests of such that we have for a considerable time been engaged in endeavouring to adapt some form of iron development to the purpose spoken of; and, though we are not able to say that we have succeeded in equalling the performance of pyrogallic acid, still we can record the production of results which, if not absolutely perfect, are sufficiently good to hold out hopes of yet greater improvement.

It must, however, be thoroughly understood that we do not set up either the pyro. and silver or iron and silver method as capable of competing with alkaline development for all purposes. The latter undoubtedly does, and until fresh discoveries are made must continue to, bear the palm for the majority of landscape work, where its greater rapidity of action renders it invaluable in obtaining effects which would be altogether impossible with any other form; but, as we have remarked upon more than one occasion recently, a generally more satisfactory result is obtained when silver is employed. For this and the reason mentioned above it is probable the silver method will continue to find a certain number of advocates, especially amongst those who are but imperfectly acquainted with the working of alkaline pyro., while those who are *au fait* in the latter process will find it to their advantage to have recourse to the silver method for intensifying.

With these preliminary remarks we may proceed to narrate our experience with iron as a substitute for pyrogallic acid. The first great drawback to its use with dry plates is to be found in the difficulty which exists in keeping the solution clear for a considerable time after it has been mixed with silver. Those who have been in the habit of working wet plates are aware that a solution of iron becomes muddy and exhausted in a much shorter time than one of pyro. equally restrained as regards its developing power; and this feature is felt to be the more inconvenient when it is considered that the development of a dry plate occupies a much longer period than a wet one, owing to the less permeable state of the film, arising from its having been dried, after which operation it loses much of its porosity. This will show the principal trouble we have had to contend against, and we shall now recount the various means we have adopted in our attempts to overcome it.

First and most naturally we essayed the ordinary wet plate developer, consisting of iron and acetic acid—fifteen grains of the former and the same number of minims of the latter to each ounce of water. This, for the reason given above, proved unsuitable, as before an image commences to appear after an ordinary exposure the developer becomes muddy from precipitation of the silver and appears to lose all power except for the production of fog. By lengthening the exposure the image may be obtained before this result ensues; but in that case the remedy is as bad as the disease, for of course flatness and want of contrast are inevitable, and all attempts to obviate the difficulty or to change the character of the picture only end in hopeless fog. By increasing the proportion of acetic acid the developing solution may be kept clean for a greater length of time; but the development is also retarded in proportion, so that no advantage is gained. These remarks apply with almost equal force whatever may be the strength of the solution used, and we have varied it from ten to thirty-five grains of iron to the ounce, with various proportions of acid, with but little change in the result. We have purposely left out of the above formulæ any mention of alcohol, as at first sight it might appear unnecessary; and so it certainly is for the purpose it is made to serve in connection with wet plates, namely, to make the developer flow readily over the film without markings. This property is obviously not required in the case of a plate which has been washed immediately before development, and cannot possibly contain any of the unevaporated solvents which are the cause of the "greasy" appearance in wet plates. But the addition of alcohol to the iron solution for a washed plate performs another function—it adds to the penetrating power of the developer without interfering with its flowing properties. In this respect we have found it to produce a slightly beneficial result; but the difference has not been sufficient to render the operation practically uccessful.

Having thus failed at the outset we were compelled to cast about for a more suitable formula, and settled first upon citric in place of acetic acid as the restrainer. The former is well known to possess greater power in retarding the reduction of the silver than the other, and is generally employed in intensifying operations, whether the reducing agent be pyro. or iron. Unfortunately, however, its action upon the developing power of the iron proved to be greater than the beneficial effect produced in keeping the solution clear; for, when used in sufficient quantity to show an advantage over acetic, in the latter respect its developing action was almost *nil*. This appears to arise from the formation of citrate of iron in the solution, which, so far as we have been able to judge, possesses but a feeble developing power. Its formation is proved by the characteristic change of colour which occurs when the acid is added to the plain iron solution. A similar decomposition may, and probably does, take place when acetic acid is used; but in the latter case it is more gradual, as may be inferred from the comparatively slight change which takes place when it is added to the iron. Another point we may mention is that acetate of iron is a very powerful developing agent—is said, indeed, by many to be superior to all the other salts of iron; so that, supposing the gradual formation of the acetate to take place, we have a solution containing besides the original sulphate and acetic acid a small but gradually increasing quantity of powerful developing substance, and a corresponding proportion of free sulphuric acid (a powerful restrainer). When citric acid is used we have the formation of a large proportion of *feeble* developing salt, and an equally large quantity of *powerful* restrainer. This theoretical view of the question is very fully borne out in practice, as a comparison of the two solutions will show.

Both citric and acetic acids having failed singly, we tried them together in various proportions, the acetic in all cases preponderating. But we found that the advantage gained by the stronger restraining action of the citric was more than counterbalanced by its increased retarding action upon development; we were, therefore, compelled to relinquish it altogether. It then struck us that by introducing a larger proportion of acetate of iron into the solution without the corresponding proportion of sulphuric acid an advantage might be gained, especially as such a developer is much used and highly recommended for wet-plate use. Accordingly, by means of acetate of soda we converted a portion of the sulphate of iron into acetate, the sulphuric acid interchanging with the acetic, and forming sulphate of soda, which, as far as developing or restraining powers are concerned, may be regarded as inert. After adding a due quantity of acetic acid we found we had a developer which afforded good hopes of future success.

After many trials—in the course of which we substituted sugar for a portion of the acetic acid, and glycerine for the alcohol—we succeeded in compassing a formula which, as we have said, though not giving the most perfect results, is still capable of doing sufficiently good work to satisfy many, and to hold out the hope that its good qualities may be still further improved. The formula stands as follows:—

Sulphate of iron	25 grains,
Acetate of soda	10 ,,
Acetic acid	20 minims,
Glycerine	5 ,,
Loaf sugar	5 to 10 grains,

to each ounce of water.

With this developer we have been able to produce pictures with an exposure about equal to that necessary when using pyro. and silver, and with results but little inferior in point of detail and half-tone, while the tone is such as to be preferred by many operators to that given by either acid or alkaline pyro.

Considering, as many do, that the action of silver development is confined almost entirely to the surface of the film, it is difficult to understand why an iron developer should behave so differently to one of pyro., other circumstances being similar. Yet that the varying permeability or porosity of the collodion exercises a powerful effect upon the result is not only proved by the fact that most of the solutions we employed work satisfactorily upon an ordinary wet plate

and not upon a dried one, but it was found that if one of the same emulsion plates be exposed immediately it is coated, after washing under the tap, without permitting it to dry, even the plain iron and acetic acid with the addition of a drop or two of silver solution will develope the image as rapidly as if it had been an ordinary bath plate. Moreover, it may be added that for bromide emulsion plates exposed wet in this manner the iron developer is probably the best of any.

NOTES OF A RECENT VISIT TO GLASGOW.

No. II.

In the window of Mr. Annan, photographer, Sauchiehall-street, we saw displayed a picture which merits some notice. It is a panorama of large dimensions, composed of four photographs each about 15 × 14 inches. These four represent a view of *Benmore House, and Loch Eck*, and, when mounted as a panorama, they form a picture about six feet in length.

What we specially wish to direct attention to is the method by which the junction of these four pictures has been effected. Nothing can wellnigh be more unpleasant than the way in which some photo-panoramas are formed. Assuming a series of successive views of a scene to have been taken so perfectly that the omega of No. 1 had its counterpart in the alpha of No. 2, and so on till the end of the series, these pictures, it may be said, will, when joined by paste, form a harmonious and continuous whole. And so they would but for certain "small things." First: when four or five prints are joined together in this way an unpleasant darkness towards the line of junction reveals a fact not always discovered under ordinary conditions of examination, viz., that the centre of each picture is much lighter than its margins. The result of this is that a panorama joined together forms, as respects light and shade, as a whole a series of luminous undulations from one end to the other, the highest light coinciding with the centre of each picture. Secondly: when a number of prints are thrown together into the toning bath it is exceedingly difficult to bring them all to such a state of uniformity that, when finished, one can be attached to the other in panoramic fashion without a slight difference in the tint being discovered. Thirdly: the mechanical junction of the pictures, no matter how skilful may be the mounter, is never so neatly effected that the observer cannot immediately discover the precise point at which the union of the two pictures has been accomplished.

All the defects just indicated are entirely obviated—at least so far as ordinary human vision is concerned—by the method adopted by Mr. Annan in the panorama to which we have above alluded. In this picture no attempt whatever is made to effect a junction of the various elementary parts of which it is composed, for each picture is, in fact, separated from its fellow to the extent of about half-an-inch, and that half-inch separation it is which so effectually masks defects of colour, coincidence, equality, and junction. The undulations of a hill, a river, a loch, a road, or the surroundings of a homestead may very easily be traced and continued from one picture to another notwithstanding the break; but not one of the defects inherent in the attempt to form a panoramic whole by pasting each picture in close juxtaposition to the other can possibly be discovered when an average amount of skill is employed in the production of such large works.

We strongly recommend the adoption of this system to those who have to supply panoramic views with only the ordinary means at command—which are often sadly inadequate—for obtaining this class of picture.

Among a great variety of apparatus which we saw in the very extensive establishment of Messrs. George Mason and Co., of Union-street—an establishment which, as we have before remarked, has not a counterpart in London—was a novel appliance for cutting albumenised paper into *carte*-sized shapes. So novel indeed is it that we are not certain whether it has yet been commercially introduced. Mr. J. B. Russell, of Kirkwall, is the inventor of the apparatus, and by its use there can be no doubt that a great saving in paper will be effected.

This cutting-frame is, as we have stated, intended to cut albumenised paper, and altogether dispenses with the use of glass-cutting shapes and knives. By its means forty-two *cartes* can be cut out of a sheet of paper, and, so far as we could see, it is impossible to spoil one in the cutting.

A flat plate of glass, measuring rather less both ways than a half-sheet of paper, is sunk in a board till nearly flush, and this board has a margin all round the glass. Two pieces of straight wood are secured on the front of the board along two sides at right angles to each other. These serve as guides. Two frames are now provided —one supplied with a series of vertical bars and the other with horizontal bars. To make use of these, a half-sheet of sensitised paper is attached to the board by means of drawing-pins, and one of the barred frames placed *in situ* above it. With a rotary paper-cutter—such as Robinson's trimmer, already described in this Journal—the half-sheet of paper is first severed vertically and then horizontally, forming twenty-one beautifully-cut *carte* pieces, which require no subsequent trimming.

The rapidity and accuracy with which paper can be cut by means of this invention of an Orkney photographer is such as to warrant us in prophesying that it will soon be adopted many hundreds of miles south of the hyperborean regions with which its first inception is associated. We feel assured that were Messrs. Mason and Co. to commence the manufacture of the Kirkwall cutting-frame and bring it before the notice of English photographers—thus making a friendly inroad "over the border"—they would confer a valuable boon upon professional artists.

THE PHOTOGRAPHIC EXHIBITION.

[Third Notice.]

Some cameras and lenses which were said to have been on the table at the opening of the Exhibition are not now discoverable. In anticipation of other exhibits on the tables likewise taking unto themselves wings and flying away, we shall preface our notes on the pictures by a few observations on the material, as distinguished from the artistic, aspect of the Exhibition.

Mr. Warnerke's large and interesting collection, which demonstrates the capabilities of pellicular photography, we shall pass over at present, as its importance demands that a special article be devoted to it as one of the "Lessons of the Exhibition."

Mr. Hare's automatic changing-box we described last year; and we have only to add that, so far as we can discover, no modification appears to have been made in it since we last described it, which speaks most favourably as to the great care bestowed on its construction and commercial introduction into the photographic world.

A portrait camera, by Mr. Meagher, of Southampton-row, to be found at present on the table, is worthy of being carefully examined. It has a repeating back, but that, however, is not the point to which we desire to direct special attention. On the top, and at each side, near to the posterior end, stands a nut with a milled head, which the finger and thumb of the spectator involuntarily grasp. Each of these milled heads controls a flap shutter situated within the camera. But these presumable shutters are not shutters in reality, but are only light pieces of framework containing masks. When we state that the camera has been expressly constructed for producing portraits of the kind known as "chromotypes," it will readily be understood that two masks when interposed successively between the lens and the sensitive surface, and especially if they are brought close up to that surface, may be used with very great effect. The first mask, accordingly, is brought into position by the rotating of the milled head to which we have alluded, so as to lie close against the collodion surface without positively touching it; and according to the form of this so the negative is a dome, cushion, oval, or other shape, all the margin being unimpressed. No sooner is the exposure over than, after first capping the lens, a second exposure is given through the mask number two, which effectually prevents any light having access to the portion before exposed, but freely admits it

to the previously-unexposed margin, on which is thus impressed the name and address of the photographer, together with any other information likely to prove of interest to his client, such as that relating to the permanence of the proof which may be printed from such a negative, or the fact that it is by a patent process. That Mr. Meagher's ingenious camera will do all that we have said there can be no doubt whatever, and for double printing upon the negative it cannot fail to be very useful.

But as the number of those who practise the "chromotype" process of printing is somewhat limited, it is well that the public should be made aware that the camera just described may be made very useful to those who desire to print natural backgrounds in their pictures, according to the system first introduced by Mr. Tilley; for it is only necessary that the flap door or hinged frame referred to be made to contain a transparency of any desirable landscape subject, and that a portrait of a sitter be taken first with a dark background, and then for a very brief period of time with a white background, the transparency during the latter exposure having been "turned on" in front of the sensitive plate, to obtain a portrait negative with a landscape background. Looking at this camera from the point of view of the Tilley background it will not fail to be quite educational. But we must now return to the pictures.

"Photography is a valuable medium for securing faithful mementoes of buildings as well as of friends who are passing away." This was the truism we heard uttered with much solemnity by a dignitary of the church, who, with a few ladies, stood before Signor Lombardi's large picture of Northumberland House, Charing-cross—a mansion which only a year since formed one of the most imposing remains of London as it was, but is now represented by a large gap in the adjacent architecture. This picture is indeed valuable, for the place which once knew the original edifice shall certainly know it no more. It is not, however, in archæology, but in the "counterfeit presentment" of the human form, that Signor Lombardi is to be found in his full strength—in greater strength than usual—as an exhibitor. Nos. 110, 111, and 113 are frames containing numerous cabinet portraits of single figures, and groups, the former embracing Rembrandts and the various other styles of lighting practised at the present time. There is a charming portrait of the Countess of Faversham on porcelain (348); but none of the numerous ladies who have been subjected to the gaze of Signor Lombardi's lens equal in point of interest or, we may add, personal attraction Mrs. Charles Bravo, who is here present in portraits of various dimensions and poses from *carte* size up to 24 × 20 inches. An enlarged portrait of Mr. Levy (279), a proprietor of the *Daily Telegraph*, will be examined with interest, as much on account of its pictorial merit as of its being an admirable portrait of one of the most enterprising journalists of the day.

Mr. William Bedford's exhibits are, as usual, characterised by technical perfection. The tone of his pictures is a black of a character similar to that of a warm engraving, to which class of pictures Mr. Bedford's photographs bear a marked resemblance. *Carnarvon Castle* (60) and *Wells Cathedral* (218) may be cited as admirable examples of Mr. Bedford's work.

The Brook (89), by Captain Abney, F.R.S., is a charming little picture of a woodland scene. Of a similar character are his pictures 319 and 322, respectively *The Rivulet* and *The Wooded Lane*, than the former of which there is scarcely a finer picture in the exhibition. To the same artist we must attribute a series of *Views of Thebes* (95)—eleven pictures of much artistic and archæological value exhibited by the Woodbury Company. Considered as mere prints they merit the highest commendation.

The works exhibited by the Rev. W. A. Crofton Atkins are interesting, both on account of the attractiveness of their subjects and, in several instances, their pictorial merit. We might specially cite some views of Amalfi, in frames 79 and 81, as excellent examples of this artist's work. Of these one is a most charming picture.

The washed-collodion-bromide-of-zinc emulsion has an able exponent in Mr. W. H. Henry, who in a frame (87) exhibits nine attractive views in North Devon and Weybridge (Surrey). The views of the *Alhambra*, by Mr. J. H. Mann (98), must not be overlooked. The gorgeous tracery of those weird apartments and halls are admirably represented.

We shall return to our series of notices of the Exhibition next week.

Scarcely sufficient attention is given, we think, by the majority of photographers to the preliminary coating employed for the purpose of causing the collodion film to adhere firmly to the plate, or for the production of a perfectly clean surface upon which to work. The latter, we may remark, we do not consider a legitimate use of the so-called "substratum," as it is little better than an expedient for covering the defects in badly-cleaned plates; it certainly performs that function, but we fancy that most photographers will agree with us that, where it is possible to employ it, a well-cleaned and polished glass plate is infinitely superior to any of the artificial surfaces used. Unfortunately, however, with large plates, and more especially in working a dry process, a substratum becomes almost a necessity; and amongst the substances usually employed india-rubber, albumen, and gelatine are the principal. The objections to india-rubber are—its liability to crack upon drying owing to unequal expansion and contraction of the compound film, its partial solubility when the collodion is poured on to it, and its proneness to attract motes, filaments, and particles of dust which may be floating about while it is in the tacky state. The first and last may be overcome by the exercise of care and ordinary precautions; but the other is a grave objection which we do not see clearly how to overcome. The effect, as may be seen by coating a portion only of a plate with india-rubber solution, is somewhat similar to that of under-exposure or development, owing, no no doubt, to the partially-dissolved india-rubber penetrating the film and rendering it impervious to the developer through a portion of its thickness. Mr. Warnerke suggests the use of a small proportion of benzole in the alcohol, with which the film is moistened previous to development; and this, by softening the india-rubber, may, no doubt, produce a beneficial effect. Albumen, though excellent in many respects, is objectionable on account of the difficulty which exists in preparing and keeping a perfectly clear solution, and its liability to absorb moisture from the atmosphere if exposed for any length of time to its influence, thus giving rise to decomposition. The substances used to preserve the solution from putrefaction—traces of which, of course, remain in the dried film—are exceedingly liable to produce an injurious effect upon the image; indeed, a substratum of albumen prepared with a minute trace of carbolic acid, as usually recommended, exercises a much more powerful action upon the sensitiveness of a plate than india-rubber. Gelatine, however, appears to be free from most of the defects alluded to; the solution is easily prepared, and when once filtered does not become muddy, as is the case with albumen. A number of plates may be prepared at once and kept without fear of deterioration. The dried film is not acted upon by the collodion; in fact, the only objection that can be raised is one in common with the albumen—the solution will not keep more than a few days. This, however, is not of great importance, as it may be prepared fresh and pure in a few minutes, which cannot be said of albumen. We have for some time used a three-grain solution of gelatine with the greatest benefit.

A NEW EMULSION PROCESS.

The labour that has been necessary to bring the new emulsion process which I am about to describe to a workable condition is my excuse for not giving publicity to it sooner. Instead of sending the Editors an emulsion I have sent the materials and formula, so that they can the better satisfy themselves of the genuineness of the process.

The materials consist of a new silver salt and a new collodion. The silver salt has some very remarkable properties, and, judging from what I have seen of it, will play a very important part in the photography of the future. It is evidently a double salt; its chemical composition I have not ascertained, having devoted my time wholly to find out its photographic properties. It is a similar

salt to that mentioned by M. Cazeneuve, in the Journal of the 1st September. I have been experimenting about eighteen months with it. I was delayed for want of collodion, &c., which I had to make.

The collodion, I think, has two valuable properties—it gives a very non-actinic colour to emulsions made with it, and it has the power of suspending silver bromide very well. I have sent two samples of it. The coloured one has bromine in it, and contains thirty-five grains of pyroxyline per ounce of solvents. The other is plain collodion with twenty-five grains of pyroxyline per ounce of solvents. The latter consists of—

Ether .... 8 parts,
Alcohol .... 1 part.

The cause of the bromised collodion being more liquid than the plain is in consequence of the solvent action of the bromine on it. I add the bromine to the collodion undiluted with either alcohol or ether. On the addition of it a dark thick mass is formed, which dissolves when shaken up in the bottle. I have sent the bromised collodion to show the action of the bromine upon it, and as it has been bromised for some time it is better on that account, should the Editors make use of it. I do not know the quantity of bromine in it; however, I can indicate the quantity, nearly, by the colour, for (say) twenty grains of silver per ounce of emulsion. The colour, when the collodion is diluted to contain the required quantity of pyroxyline, will have to be the same as sample; more bromine, of course, will have to be added to it.

I may here state that I have been trying a collodion that imparts very little colour to the emulsion, so that, by making emulsions with the two sorts separately, they can be mixed to produce any intensity of colour required; for on being able to do this the rapidity of this emulsion depends.

Formulæ.

Bromised Collodion.

Take of a sixty-four-grain alcholic solution of—
Anhydrous bromide of cadmium............ 1½ drachm,
or Bromine.. 8 grains,
Pure ether .... 4 drachms,
Pyroxyline.................................5, 6, or 7 grains,

according to the thickness of emulsion required. Put the above into a bottle and let it stand till dissolved. If the collodion is to be bromised with bromine the pyroxyline is dissolved first, and the bromine added afterwards.

Alcoholic Solution of Silver.

New silver salt .... 15 grains.

Put the silver into a three-inch evaporating dish, add three drachms of absolute alcohol, and grind the silver in the alcohol with a small pestle. Add two more drachms of alcohol, pouring it in on the end of the pestle to remove any adhering silver. Place the evaporating-dish on a retort-stand over a small gas flame, and about five or six inches above it; let the alcohol boil, moving about the silver in it with a glass rod. When the silver is dissolved about two drachms of the alcohol will have evaporated. Take the evaporating-dish away from the source of heat, and pour the silver solution into the bottle containing the bromised collodion at three different times, shaking after each addition. A little of the emulsion formed is then poured into the evaporating-dish and stirred up with any silver that remains. It is allowed to set, and is then scraped out and put back into the bottle among the rest of the emulsion.

For small quantities of emulsion there is no danger in heating the alcoholic solution of silver at a gas flame; for large quantities a sand-bath is requisite. Collodion bromised with bromine is poured into the evaporating-dish among the alcoholic solution of silver and stirred, then poured into a bottle.

The emulsion at this stage is not fit to work with on account of there being free silver in it. It is very repellent to water, and there is a great amount of structure in the films made with it; therefore, to free it from these objectionable properties, water must be added to the emulsion. The quantity of water in the emulsion determines the length of time the emulsion will keep, and the length of time it will take, after being made, to be in a working condition. For instance: by making it with methylated solvents it can be used within an hour; but the silver bromide will be deposited in a few days. Instead of adding water, when I want the emulsion to keep some time, I add the froth of albumen; that is, the albumen of an egg beaten up undiluted with water, as much as can be lifted in a teaspoon, to ten ounces of emulsion. An emulsion made with pure solvents, and albumen added in the above proportion, will take from ten to fourteen days to be in working condition; it will then flow over a plate without any structure, and will bear a rather strong alkaline developer on it (in the dark room)—ammonia carbonate and pyrogallic acid—without being reduced.

A few of the conditions or properties of the new emulsion are the opposite of similar conditions, &c., of emulsions now in use. Take Colonel Stuart Wortley's uranium and bromide of silver emulsion as an instance. It may be assumed to be acid because the nitrate of uranium is recommended to be made acid. The new emulsion is alkaliine; it has a free bromide or bromine, other than the silver bromide, in it, being most sensitive in that condition, and from one emulsion I make up with nitrate of uranium added I am inclined to think that the addition of that salt to it will enable the emulsion to work with a greater quantity of free bromide in it. It will be perceived that, owing to the emulsion containing free bromide, none is required in the developer.

Coating the Plate.—I give the plates a preliminary coating of gelatine, first cleaning the plate with old collodion, using a pad of cotton-wool. The hot gelatine solution will flow, after the above treatment, over the plate and out to the edges like collodion. Albumen should not be used, as the emulsion will dissolve it.

The plates are coated with emulsion in the usual way, and immersed in water until the greasy lines have disappeared. The plates are then flowed over with a solution of one part of glycerine and one part of water. Two grains of pyrogallic acid may be added to one ounce of the glycerine solution, and when the emulsion is in very good condition the alkaline developer may be poured over the plate before exposure. I have carried the plates moistened with glycerine long distances in very hot weather, and found them all right and very rapid. They have remained sixteen hours in water, and then gave good pictures.

For the new emulsion plates there need be no great nicety about the strength of the developer or the proportions in which the ammonia and pyrogallic acid are mixed. I have used saturated solutions of ammonia carbonate in water, and pyrogallic acid in alcohol. The only thing I have observed in negatives developed with strong developers is a number of minute, transparent specks—the greater number on the high lights. They were evidently caused by the energetic action of the strong developer.

I made some dry plates with this emulsion by immersing them in a solution of gelatine and water for four hours. They were very rapid, but blistered badly. I think this would be prevented by coating the plates with a preliminary coating of india-rubber.

I use hyposulphite of soda for fixing with.

I think I have now given what will enable the Editors to make and try this emulsion. I have made three or four different kinds of emulsion by means of the new silver salt, including an iodide of silver emulsion. It is made by first adding iodine to the collodion, and then the alcoholic solution of silver. The first effect produced is the whole becomes of a dark blue colour, after which the iodide of silver forms. I have coated plates with this emulsion, and immersed them in a nitrate of silver bath. They were very sensitive, and were remarkable for the different gradations of colour in the film as seen by transmitted light. Some of the plates were dark blue at one edge of the plate, purple in the centre, and yellow at the opposite edge. Evidently the variable thickness of the film was the cause of this, the thick part containing a greater depth of a certain deposit.

I will, next week, send an account of several experiments made with the silver salts. I do not intend to publish my methods of making the collodion and silver salts just yet, but will find the means of supplying them which will in no way interfere with their practical application. The salt can be used in other branches besides photography. J. Johnston.

Addendum.

Since writing the foregoing description of the new emulsion process I have been thinking over some portions of it, and suspect I have not made my meaning sufficiently clear. I therefore propose to refer to these parts again under the following headings:—

The Collodion.—It will be found, after exposing and developing a plate coated with an emulsion made with the collodion sent that the picture will be wholly on the surface, and the shadows considerably wanting in detail. The cause is, principally, the excess of colour of the emulsion when made with the above collodion alone.

The Emulsion.—The emulsion made with the bromide of cadmium is more sensitive than that made with bromine, if both have the same quantity of silver per ounce of emulsion; but the latter causes the silver to be deposited in a finer state of division—in fact, the deposited silver, when magnified, looks like a stain.

Plates keep good longer in water when made with an emulsion that is slowly matured. The effect that water has on the emulsion is to destroy its horny or tenacious consistency, which is very con-

siderable when newly made. Castile soap added to the emulsion makes it very thin without depositing the bromide of silver.

The Developer.—If a large quantity of alcohol be used in the developer the plates will not develope; but, while the developer is on a plate, if it be dipped in water the picture will appear. I have no doubt that this property will be an advantage in some instances.

Fixing Solution.—If the hyposulphite of soda have a considerable quantity of bromide of silver dissolved in it plates fixed with it may be redeveloped, bringing out more detail in the shadows.

The bromide of silver may be formed very quickly in the film in a bath made with the new silver salt; in fact, so energetic is the action when the soluble bromide in the collodion film exceeds ten grains per ounce of collodion that the film is entirely broken up. I will have more to say on this subject anon.—J. J.

[We shall have some remarks to make on Mr. Johnston's process in our next.—Eds.]

CERAMIC PHOTOGRAPHY.

I have more than once expressed my belief that the professional photographer is decidedly conservative in his tendencies—willing to do the very best he can with such methods of working as he has been accustomed to, but with difficulty induced to adopt or even try any proposed modification, however great an improvement in the eyes of its inventor it may seem to be. This prevalent disinclination to the adoption of anything new may, to a certain extent, arise from the fact that many operators, with more zeal than experience, hasten to publish methods of working, or formulæ, by which, in their opinion, certain excellent results had been obtained, while in reality the success was the result of a happy accident to which neither the method or the formula contributed in the slightest degree. But the fact that statements occasionally find their way into the journals that will not bear the test of experiment does not fully account for another fact—that many of the recently-adopted undoubted improvements, both in material and methods of working, had again and again been published by myself and others, and been as often neglected, until some one of greater than ordinary energy, or with a view to self-interest, took them up and persevered until he had commanded the attention of the profession at large.

I suppose there can be little doubt that professional photographers are as much alive to the value of money as are the members of any other profession, and, therefore, it is not a little astonishing that there are many applications of the art that with proper cultivation could not fail to be pecuniarily remunerative altogether neglected, or practised to such a limited extent that they fail to attract the attention of the public.

To nothing, perhaps, do the foregoing observations more fully apply than to the branch of art which forms the subject of this and a succeeding article. A good ceramic photograph, or photographic enamel, is at once the most beautiful and most durable of all photographic productions, and it is really difficult to comprehend why they have not long ago become much more popular than they are.

The art of enamelling, or producing pictures in enamel, is very old, and has been practised with much success by several nations. More than seventy years ago Hodson and Dougall, in their *Cabinet of the Arts*, published an account of the process as then practised, from which we learn that it was very complicated and difficult, the picture requiring sometimes as many as eight or ten firings, any one of which, through a trifling oversight, might ruin the whole; and yet the work then done was extremely beautiful, although necessarily costly. I have before me while I write one produced about that time—a copy of Murillo's *Madonna*, of exquisite beauty—the technique of which is absolutely perfect, notwithstanding the difficulties of the process. Compared with the production of such enamel pictures the practice of ceramic photography is simply child's play; and yet, notwithstanding their admitted beauty and absolute permanence, their production is confined to very few hands. We are told, of course, that this arises from the fact that there is no demand for the productions. This I readily admit, but reply that the demand should, and could, be created. At the present moment nine-tenths of the general public understand by an enamelled photograph a *carte de visite* with a highly-glazed surface that is easily ruined by scratching, and, on the whole, prefer the more modest effect of the burnisher; but if every photographer in the country had in his showroom a few specimens of good enamels suitable for lockets, brooches, bracelets, &c., &c., and also some on cups and saucers and other small articles of similar ware, and would take the trouble to bring them to the notice of his *clientèle*, I am fully persuaded that within twelve months the enamelling furnace would be as common and as generally used in almost every studio in the country as the collodion bottle or the rolling-press. Why should birthday and christening presents be confined to silver knives and forks, or suitably-inscribed electro-plated tankards, when for less money much more beautiful things could be obtained in the shape of elegant articles of porcelain with photographic portraits of either the donor or the receiver, or perhaps of both, which would be much more highly prized?

I am aware that photographers generally will, at first sight, regard such a state of things as chimerical, the supposed difficulties of enamelling being so great; but the simple fact is that the difficulties of enamelling are, like most other supposed difficulties, real only so long as looked at from a distance, but which vanish like mist before sunshine when fairly grappled with. Readers of the journals generally have read from time to time what has been published on the subject, but without much thought as to the principle involved in the process, and, coming to the somewhat general conclusion that the manipulation was one requiring more than ordinary care, left it to others to be worked out, almost thankful that as the pictures were not asked for they need not trouble themselves about them.

The simple fact is that from time to time all that need be known for the successful production of photographic enamels has been published in The British Journal of Photography; and the difficulties are so few that anyone who can make a good negative and a first-rate transparency will, after a few trials, find enamelling an easy operation.

By way of encouragement I may say that when Mr. Henderson, of Montreal, was in this country some time ago he showed me some of his first attempts in this direction, and both in colour and detail they were quite equal to the average work of the best artists. More recently, in Glasgow, I saw the first attempts of one of the ordinary photographers there, which were suitable for exhibition at any of the photographic exhibitions.

I have recently been making a few experiments with tolerable success, and had several opportunities of watching the operations of a successful operator on porcelain articles, as well as on the ordinary tablets, and propose next week to publish the notes then made, in the hope that thereby a greater number of photographers may be induced to turn their attention to what should be a profitable branch of photography. John Nicol, Ph.D.

ON THE PREPARATION AND COLOURING OF TRANSPARENCIES FOR THE MAGIC LANTERN.

Chapter V.—Mounting.

As it will depend entirely on the amount of business done whether apparatus for cutting out the mounts can be afforded, I will only say that it would be much cheaper in the end to have proper dies for cutting out the mounts—one for circles, and one square, with, perhaps, rounded corners; but, as most orders that would be given to photographers would be for peculiar subjects, it is quite possible the customer might insist on the original shape being preserved, and not allow the picture to be cut and carved to suit these dies. To make a die for every set of slides would be out of the question; but, as in nearly every case the party who gives the order is the person who is going to use the slides, the demand may quite easily and reasonably be complied with, although in getting up stock at spare times it would be better to finish the slides with mounts cut with the die, as shapes depend a great deal upon the appearance of the slide for their sale. However, for mounting peculiar-shaped slides for private customers, use black paper which has been gummed on one side and allowed to dry; lay it on a glass plate, and, using another glass large enough as a straight edge, cut the paper into strips broad enough to cover the margins of the slides—some broad and some narrow. Then lay the black paper on the slide after damping the gum, putting on the top and bottom first close to the edge of the picture, then the ends or sides. Trim off with a pair of shears any parts of the black paper which may overlap the glass, and allow to dry. At this stage it would be as well to put on the names. If for odd subjects write the name on a piece of white gummed paper, but if for slides of which many are done it would be as well to have the names printed. These names might be printed in the form of a catalogue, so that they might also be given away to customers, and used for naming slides. It will be necessary, also, to print the names of the firms who have granted permission to copy their published works; something in the following style will do:—"From *The Children's Prize*, by permission of W. Wells Gardners, Esq.;" "From *The Prodigal Son*, by permission of Messrs. James Nisbet and Co.;" or, simply, "Copied by permission of Messrs. Cassell, Petter, and Galpin."

These instructions having been attended to and the slide properly mounted a clean glass the size of the slide is placed on the face of it, and bound with gum paper of any colour, but by preference black. Most manufacturers use black paper, but my reason for saying "any colour" is this:—I adopted a plan with those customers who favour me with frequent orders of binding each new set with a different colour, with which my customers were highly pleased. Although several sets of slides should happen to get mixed, each particular set could at once be picked out without any loss of time from the colour of the binding. I think this hint might be more adopted, so that it might come into general use. For instance: let it be understood that all slides done—say of *The Prodigal Son*—be bound in green, *The Pilgrim's Progress* in blue, Scripture views white, Scotch views red, and so on. As any colour of paper or any number of colours may easily be procured, each establishment would, of course, adopt their own colours according to the subjects which they published.

Concluding Remarks.—The slide is now finished, which also brings my instructions to a close; but before leaving off I wish to impress upon the reader, more especially a beginner, the necessity of steady practice, and not to be disheartened by a few failures, as it is quite impossible for anyone to write instructions for another in such a way that the learner can at once pick up the brush and equal the person who may be giving the instructions. It is quite possible that practice and study may enable the pupil to excel the master, but not otherwise.

The instructions I have given are laid before the reader without reserve, so that if any failures should occur it must not be supposed for a moment that it is owing to some secret way of working still unfolded, but simply from the want of experience. I have also devoted the whole of these chapters to the instruction only so far as concerns the slide, and avoided any technical details which might confuse. As there are many cheap and excellent works already published on art and the theory of colouring, it would have been a waste of time and space to have entered more fully into this subject, as what applies to one applies to all, so far as theory is concerned. In parting from the reader I do so with this advice:—Let cleanliness in everything be your motto. Do not work with dirty water, dirty brushes, or a dirty palette. Renew the colours often, as they get full of dirt if the palette be exposed. Finally: use the best colours, the best brushes, the best glass, and the best of everything. It is the most profitable, the most agreeable to work with, and produces the best results. THOMAS ROSS.

AN IMPROVED EMULSION PROCESS WITH ALCOHOLIC PRESERVATIVE.

THE process now to be described yields very fine results with great certainty, the colour of the negative being such as to make it non-actinic. By adopting my mode of development the exposure required will be shorter than that for the wet collodion process. No after-intensification will be required, as this quality is acquired by the ammonia which is added to the solution of pyrogallic acid.

My modification is based on Mr. Newton's important discovery, by which he is able to keep indefinitely a bromide emulsion with an excess of nitrate of silver. The emulsion thus prepared is very sensitive and produces the images perfectly free from fog. Another advantage in this mode of preparation is that, although the nitrate of silver is in excess, it is not necessary to subject the plates to the usual washing, for it suffices to immerse them in, or flood them with, the preservative.

I have adopted a modification in the preparation of these emulsions which, I believe, will be found a very great improvement, inasmuch as it renders the process still more simple and the results more certain and perfect than formerly. It consists in the use of an alcoholic preservative in lieu of an aqueous solution. My plates are prepared in the ordinary way. I apply my preservative by pouring it on the plate in the same way as collodion, and after waiting for a few seconds I pour it back again. This does not occupy much time. The adoption of this system secures an immunity from stains or spots, and the image will develope readily, especially if my developer be used.

First prepare an emulsion after the method indicated in the excellent memoir of Mr. Newton:—

1. *Bromised Collodion.*

Absolute alcohol	288	parts.
Ether..	480	,,
Pyroxyline..	7	,,
Double bromide of cadmium and ammonium	16	,,

2. *Emulsion.*

Bromised collodion (as foregoing).........	100	parts.
Nitrate of silver	3·50	,,

Dissolve the silver in twenty-five parts of warm alcohol. The emulsion is prepared in the ordinary manner. It contains an excess of uncombined nitrate of silver to the extent of about 0·40 to 0·60 per cent. It must be allowed to stand ten or twelve hours, when it will be of a cream colour and have attained its highest sensitiveness. Chloride of calcium to the extent of 0·30 per cent. must next be added, and it must be allowed to stand for six hours, when, after filtration, it is ready for use.

Alcoholic Preservative.

Alcohol	288	parts.
Tannin	2·40	,,
Salicine	2·40	,,
Gallic acid	1	part.

When it is all dissolved add sufficient caramel to make it of an an orange tint, and filter. M. SIDMUND SINGER.

—*Bulletin Belge de Photographie.*

(To be continued.)

PHOTOGRAPHS UPON ENAMEL AND PORCELAIN.

A BRANCH of our art little or not at all practised in Germany is the production of unburnt-in photographs upon opal glass, enamel, porcelain, or alba plates; yet the results have such an extraordinary beauty and artistic effect that the process deserves greater attention. These pictures have until now only been produced by a few Parisian photographers, and their mode of production has been kept secret; but in England the attention paid by photographers to this sort of picture is greatly on the increase. We place before our readers two processes, the second of which we have practically tested and found it worthy of recommendation.

When one has to do with a flat surface the picture may be copied directly from the negative; but it is better to use a copying camera, because then one can get copies of any desired degree of enlargement or reduction from the same negative. The copying camera is well known, but it will not be out of place to describe briefly a contrivance which can easily be affixed to any camera in order to copy negatives. The lens is fixed into the camera as usual. A passage, folding bellows-wise, is placed in front of the camera in order to shut off all side light from the objective. At the end of the passage, farthest away from the camera, an arrangement is made by which negatives of different sizes may be fastened in position, and one centimètre in front of the negative a ground glass is placed. In front of the latter a mirror is set so that it may be unfastened and lowered until the diffused light, reflected upon the ground glass and softened by it, falls upon the negative and illuminates it equally.

If the enamel picture be desired to be larger than the negative the latter is pushed, along with the passage, towards the camera; if the picture be desired smaller the proceedings are reversed, and the exact focus will then be found behind the camera. The negative being focussed to the desired size, an alba plate or opal plate is prepared with a negative collodion, which gives very fine details; the silvered plate is placed in the dark slide, sufficiently exposed and developed in the usual manner, but without being intensified with silver.

If it be wished to produce the pictures upon oval and convex enamel plates, of course it is evident that an especial dark slide will be required; or, if the ordinary dark slide be deep enough to receive the enamel plate, the latter may be held in place by an oval mat. The picture may be previously focussed with the same mat placed in the ordinary ground glass frame, and with an oval glass prepared for the focussing by means of a matt varnish.

According to one process, taken from the *Photographic Times*, the picture is developed with iron, fixed with soda, and, after being carefully washed, toned in the following way:—One gramme of chloride of gold is dissolved in sixty grammes of water. Four grammes of the foregoing solution are used to sixty grammes of water, and the whole is poured equally over the picture until the latter has assumed a light rose tint, whereupon it is again well washed with water.

Of a saturated stock solution of mercuric sublimate take four grammes and mix with thirty grammes of water. This solution is poured upon the gold-toned plate, which soon assumes a deep purplish-black tint and allows the picture to develope brilliantly.

The toning, but even more so the subsequent mercuric reaction, requires practice, and must be superintended with the greatest exactitude. If the mercury be left too long upon the picture the latter loses its brilliancy, and by degrees becomes quite pale and

white; therefore, as soon as the right moment arrives, the plate must immediately be well washed. The picture is then dried and varnished with a clear varnish.

The French method of producing pictures upon enamel plates is somewhat different from the foregoing. Instead of the iron developer they are developed with pyrogallic acid:—

Water	250 grammes.
Pyrogallic acid	2 ,,
Citric acid	2 ,,

A somewhat longer exposure is required than with the iron developer; yet for this purpose the picture appears finer. When the picture is sufficiently developed it should be very carefully rinsed with water and fixed with cyanide of potassium.

Solutions to be Prepared Beforehand for the Toning Bath:—1. Seven grammes of chloride of mercury in 100 grammes of water. 2. Three grammes of chloride of gold in 400 grammes of water. To 100 parts of water add ten parts of each of the previously-prepared solutions, and pour over the picture. This process also requires to be carefully watched until the desired strength has been attained, after which the picture is again carefully washed and some diluted ammonia poured over it. Lastly: if necessary the picture is retouched and varnished.

These pictures on enamel plates may be very beautifully and effectively coloured either in oil or water-colours. If in that case it be desirable to re-varnish a turpentine varnish must be chosen which shall not dissolve the first spirit varnish. T. H. Voigt.
—*Photographische Monatsblätter.*

NOTES FROM THE NORTH.

Do all photographers varnish their negatives? I had supposed so till a few days ago, when I called on Mr. Tunny and found him——well not in the most amiable of moods. He had taken to an overhauling of his earlier negatives, some of which are, or ought to be, of considerable value; but most of them are almost ruined by oxidation of the metallic deposit or by scratching, and many have suffered from both causes. The fact seems to be that previous to 1860, or thereabouts, Mr. Tunny had, for some forgotten reason, left his negatives unvarnished, the result being the above-mentioned partial, and in some cases total, destruction of valuable property, and the consequent self-application of sundry epithets so far from complimentary that I would not advise anyone to try it on in the same way.

Speaking of varnish reminds me that we hardly ever now hear of the loss of negatives through cracking of the varnished film. I suppose this arises, to a large extent, from the use of simpler varnishes, and probably the abandoning of the use of bleached lac. I have not for years had a cracked film, and the only varnish I use is a simple solution of sandarac. My plan is to put two pounds of the gum into a Winchester quart and fill up with methylated spirit. In the course of a day or two, with an occasional shake, the gum dissolves, and by and by the varnish becomes perfectly bright. A little of the thick varnish so made is poured into the hand bottle, and sufficient methylated spirit added to dilute to a suitable strength. When the varnish is quite new there is some difficulty in getting a perfectly glossy surface, but when it is sufficiently aged—say six months old—it is more easily applied than any other I have tried, and has the advantage of being cheaper than almost anything else that can be made. It is, in fact, so cheap that I use it for cleaning plates that have proved not worth varnishing for their printing qualities. I daresay most dry-plate workers occasionally find it very difficult to remove the dried film from a plate that had received a preliminary coating of albumen, and that even a hot solution of soda is not always effectual. If such a plate has been varnished, however, an immersion for a few minutes in the solution brings the whole off in one sheet, leaving nothing behind but clean glass. In consequence of this fact I invariably varnish every plate that has been allowed to dry after development, whether it be fit for printing or not.

While on a recent visit to the "Kingdom of Fife" I called on a photographer, and found him in trouble. Sheet after sheet of paper had been floated on his bath; but not a print could be got that was not completely covered by spots or markings over the whole surface, just as if a mixture of purple and red colouring matter had been dusted from a pepper-box. On lifting the paper from the liquid the solution became aggregated into minute globules, leaving innumerable spots, apparently dry, even after the sheet had been drawn slowly across the lip of the dish. Various strengths of solution had been tried, and at the time of my visit he was using a bath of eighty grains. To this bath was added twenty-five per cent. of methylated spirit, and this proved to be a perfect cure. In a note subsequently received he says that an equally good result is obtained after sponging the surface well with the methylated spirit. John Nicol, Ph.D.

THE CENTENNIAL EXHIBITION.

Sunlight and Shadow.—Photography as a Fine Art.—Early Daguerreotype.—Auld Lang Syne.—How we Looked Twenty Years Ago.—Grand Groups of the Living and the Dead.

At the eastern end of the Memorial Hall stands a modest, unpretentious building dedicated for the time being to photographic art. This is an art that, like telegraphy, has grown from almost nothing to its present colossal proportions in the memory of living men. It seems only like a few years ago since I looked on the first daguerreotype, and I recollect how I twisted and turned it and held it in different lights to make out the face that I was not quite sure was there or not. Then came attempts at photography, the first I ever saw being called a "Talbotype." It was supposed to be the picture of a country house, but it looked like a mud-scow struck by lightning. Then came the Hillotype—a type of which, if successfully carried out according to the original design of the inventor, would have sent a man without benefit of the clergy to the state prison or a lunatic asylum.

The men who have made the art what it is today are, many of them, fortunately still alive; they are our friends and our neighbours, and, while ranking very high in our estimation as artists and as men, they have always seemed much nearer to us than the knights of the chisel or the brush. Photography is essentially the poor man's art; by it he becomes a traveller and a critic. It brings back the associations of childhood years after they have vanished, and it surrounds you with the faces of loved ones "when the silver cord is loosed and the golden bowl is broken."

Entering the eastern door you find in a niche on the left an exhibit of Doremus, of Paterson, N.J. This artist has evidently not confined his excursions to the limits of the city of Paterson, for we find ourselves surrounded by views of the Mississippi and scenes of the far west. On the opposite side of the hall Charles Faxon gives us a picture of Joe Jefferson as *Rip Van Winkle;* not a little pocket edition of a great man, but a full life-sized portrait of the worthless vagabond Dutchman just as he appeared when he wandered about through the enchanted mountains of Catskill. Schwind and Kruger, of New York, have a magnificent case of pictures, and Holyland, of Baltimore, has some excellent artistic groupings. A little beyond Allen and Rowell have a splendid collection of portraits; Loyde Garrison, Wendell Phillips, and Charles Sumner hang side by side. Near by is a picture called *Dressed for the Bridal*, by Moser, of Chicago, a work of especial merit, and near it the coloured portrait of a lady, which is a picture of the highest order. Sarony, of New York, has not a large exhibit, but one of his pictures —a scene from the play of *Pique*, lately performed at the Fifth Avenue Theatre—is unsurpassed by any picture in the collection.

A frame hangs against the north wall which interested me exceedingly; in it was a number of likenesses, almost every face of which I knew in years long gone by. The daguerreotypes were taken by Fitzgibbon, of St. Louis, over a quarter of a century ago, and then, no doubt, were considered very fine specimens of the wonderful daguerrean art. The originals of many of those liknesses have passed over Jordan's stormy banks and now stand on the other side, and those who still survive find the almond tree begin to flourish and discover that the grasshopper is a burden. The dramatic profession is largely represented. A little, light strippling of a girl is the portraiture of Maggie Mitchell—our Maggie, the little witching, winning mortal, who, as *Fanchon* and *Barefoot*, has danced her way into all of our hearts, and year after year as she came round we went to see her do the same thing over and over again till it seemed we had known her all our lives, and we never realised that we ourselves were growing old, or that the little girl that charmed us in auld langsyne is now a stout matronly woman, with a substantial bank account, and with silver threads among the gold, and the crowsfeet battling for lines upon those cheeks that we all were dying to have a kiss at. Bye-bye, *mon cher ami!* beautiful as you looked twenty-five years ago we cannot stop here to make love; we have grave matters on hand, nothing less than the canons of art, to say nothing of the small arms, so let us pass on to the next. This is Mrs. Coleman Pope. It is more than thirty years ago since I first saw her at the old Broadway Theatre. She was then in the zenith of her beauty—a woman tall and stately, a sort of mixture of Venus and Diana. Oh! what a face! what a neck! what arms! what—no, I shall stop right here. I will only remark that she wore a short tunic that reached the knee. I went home and dreamed of her all night, and thought I should like to be an actor. Poor woman, if she still survive, she has rheumatism, and pains in her back, and neuralgia, and all those miserable ailings that remind us that it is about time to balance our ledgers.

There are several pictures of Gustavus Brooke, one of the very best actors that ever visited America. Melodramatic in many things, has had as much of the stuff in him of which good actors are made as any man I

now remember; and what a glorious voice! It seems to me I can almost hear it now, though the waves of the ocean closed over him many years ago. The ship in which he had engaged passage for Sydney was sunk in sight of the British coast, and, lighting a cigar a few minutes before she went down, poor Brooke met his fate like a Briton and a hero. Estelle Potter, well known throughout the West and California, is also among the number; she, too, can be no chicken by this time, but like the rest of us discovers that time still rolls on. The Bateman Children have a place in the list; alas! children no longer. I do not know whether Kate is a grandmother yet; if she be not, no doubt she will be. And Eliza Logan is among the number—a splendid actress, and an admirable woman.

Next we come to the illustrations of the *Seven Ages*, by Lundy, of Cincinnati—excellent in conception and execution. Gutekunst, of Philadelphia, has some magnificent portraits, which will give him a foremost position in the ranks of American artists. Particularly good are the likenesses of Mr. Goshorn, the Director-General, and also of General Hawley, President of the Commission. Hawley should do something handsome for Gutekunst, for Gutekunst has done something very handsome for Hawley. It will astonish the good folks of the nutmeg state if that picture ever go to Hartford; in fact, I think that it astonishes Hawley himself when he looks at it. Bully for Gutekunst! If ever I have my likeness taken, Gutekunst is my man!

Bradley and Rulofson, of San Francisco, have some admirable Californian scenes, but their exhibit is not what might be reasonably expected from so great a firm, ranking, as they do, among the very best photographers in the United States. Brady has a number of magnificent specimens of portraiture, and no place in this exhibition combines any greater interest than his. In the space of a few feet hang a number of faces which call up a world of widely-different associations, and you look on them with the assurance that they are all true to the life. Just think of it! here hang the faces of Edgar Allen Poe, Audubon, Henry Wilson, Lincoln, Grant, Lee, Calhoun, Farragut, Webster, Jackson, and Morse. No such group can be found in the limits of America in so small a space, and I doubt if they can be found in the world. The likeness of General Lee was taken some years before the war; but on it is the same calm sweetness of expression which even disaster and defeat were not able to destroy. Next to him, in civilian's dress, sits General Grant, and near him Lincoln, the likeness being the one best known to the American people. Jackson's portrait was taken at the "Hermitage" a little while before his death, and Webster's just after he had made his celebrated reply to Hayne. Farragut is taken in full naval costume; he stands with a field-glass in his hand, and you can almost hear him sing out, "D—n the torpedoes!" as he did while standing in the shrouds of the *Hartford*. Calhoun is there too, and Edgar Allen Poe. None of these faces represent peaceful lives; all of them have had more of storm than sunshine—the poor poet of the *Raven* as well as the statesman and warrior. The names of the group fill a large space in our American history, and will as long as history is remembered.

Among the grandest specimens of photographic art ever seen in any country is the array of pictures of rural scenery, by Vernon Heath, of England. America has done much for the photographic art, but in the American collection there is nothing to compare with them, nor, indeed, would there be in any collection were it not for the exhibit of Irish scenes, by Payne Jennings, of Dublin. I know not to what point of excellence future generations may raise the art of photography, but certain it is that in our time no such pictures have been seen in America as the pictures exhibited by Mr. Jennings. I know not which to admire most—the artistic merit of the selection or the superlative excellence of the execution. Its like has never been seen in the United States, and I doubt if its superior can be found in the world.

Philadelphia, August 25, 1876. BROADBRIM.

RETOUCHING NEGATIVES.

[A communication to the Photographic Art Society of the Pacific.]

RETOUCHING negatives is a subject of vital importance to photographers, and one upon which a great diversity of opinion obtains. We have enthusiastic admirers of the works of the camera who affect a preference for the photograph pure and simple, free from any embellishment. To them photography is the sum of all good, and every effort to improve it, which involves therein the honours with any other branch of art, is resisted as pernicious, tending, as they claim, to eradicate the features which distinguish photographs from other pictures; and in support of their position they point to the acrimonious controversy which occurred some years since in the city of London. It seems that at an art exhibition a department was set apart for photographs, to which photographers brought their art works, having availed themselves of all the means at their command to produce fine pictures; but they were met at the door of Photographic Hall by the committee, who informed them that "*weaving spiders come not here*"—these pictures evince too much care in finishing, too much industry, too much enterprise, in short, they show unmistakable evidence of having been tampered with by an artist. "None but photographs admitted here," say they, urging in defence of their zeal the manifest injustice of requiring photographs to compete with these—the result of several arts, the work of many hands. Did these men recognise in this a defeat? On the contrary, they argued that if their productions were too meritorious to entitle them to a place in the lower, they had gained an entrance among the higher, walks of art.

We next find them knocking at the door of the inner temple. Here, also, they are met by a committee on classification, who discover oil, water-colour, india-ink, pencil, and photograph combined, saying—"These pictures belong to no known class; beautiful though they be they are only photographs, and must be content with a seat below." Thus were they excluded from both the upper and the lower house by committees whose loyalty to their dictative branches would set up a lion in the path of photographic advancement, and deprive the public of the advantages of the then almost unknown possibilities of our beautiful art. And thus we have ever found it that the photographer who pushes the retouching of either negative or photograph beyond what has been termed "legitimate photography" meets with opposition from the artist, who asserts that he has been foraging in his domain, while the son of Helios urges that he is poor indeed when compelled to draw so largely on other sources for the perfection of his work. And it is within the memory of us all that, at an exhibition in the Mechanics' Institute in this city, a committee composed of some of our best known artists took occasion to condemn the *methods* by which certain coloured photographs were produced, while they had nothing but photographs to work on for the pictures coloured by themselves. But that the "end justifies the means" is well attested in that photography has called to its aid some of the best artists of every clime, and found those who are willing to contribute their skill, experience, and culture in imparting to the photograph those characteristics of high art which demand for it a place in every circle of refinement.

So it will be seen that, before we can agree upon the best method of retouching a negative, we must first gain the consent of the stickler for "distinctive photography" that the negative should be retouched at all; and, second, if retouched, how far can we carry the process without going beyond the sacred precints of legitimacy. In the consideration of this subject let us inquire what is the object held in view in opening a photographic establishment. Is it in order that we shall produce photographs as such? or have we and our families business necessities like unto other men's, which render success indispensable? An affirmative answer to these questions, coupled with our daily experience with patrons, leaves no room for argument as to the necessity and propriety of retouching negatives. But to settle the point as to how far we may properly carry the process is not so easy. We are constantly told by Mr. A. that, with regard to Mr. B., we have made him young; we have made him a flat, baby-faced fellow, taken all the character out of his face, over-retouching it, &c., &c., all of which we know to be true, and, modestly assenting, seek to excuse our fault on the score of necessity. "Well," says Mr. A., "that is all right, but none of that for me; leave all the character in my face; no retouching on my negative, or, if any, only the least little bit just enough to remove imperfections in the negative."—And so passing round the room he hurls his anathema against all your best pictures, repeating his injunction to leave everything in his hands.

All this, coming as it does from a gentleman of wealth, education, and refinement—more than likely a distinguished member of a learned profession—would, in nine cases out of ten, mislead the inexperienced photographer, luring him on to certain ruin. But the wary practitioner, who at once recognises the necessities of the case, takes the negative of this Mr. A. to his best retoucher, points out all the ravages of time, and directs that they be most carefully and thoroughly removed—calls particular attention to the chiselling of thought, and requests that they be most delicately modified, and the youthful perfection of face and form restored to the last degree. He then makes two or three pictures from the negative thus "over-retouched" for Mr. A.'s inspection. Thus armed he waits his coming, but not long; doubtless he has been in three or four times in the meantime to see "how you are getting along with it," and to call attention to some dozen or two little things he would like to have done which he forgot to mention. "Don't do much retouching, you know. Just a little here and there, and the other place, you know, but leave all the character in it, all the modulations; these things don't look like anybody." But at last he comes; you hold your breath with apprehension as you see that fearful frown gather upon his stately brow, wondering what will come of it; but you are reassured as his features relax upon your apologetically passing one over the counter, timidly explaining, "it is not quite finished, you know," "only made as an advance proof to look at, you know," "only made as an advance proof, you see, for you to look at, you know." "Yes, yes," says Mr. A., noticing at the same time that you retain one or two more in your hand;" "but what did you make so many for till you retouched the negative?" But what did you make so many for till you retouched the negative! And, astounding as this expression is, it stops not here, for this same Mr. A. goes on to explain that "this is very good, and if you will just correct this deficiency in hair, take out these ugly shadows from around the mouth and eyes, which I have not," and then, adding a long list of similar corrections, "which now just write down so as you won't forget—it will be quite satisfactory;" and he goes away thoroughly convinced that over-retouching is an abomination.

And while he complains that every picture in the room is over-retouched, his have not been retouched enough. Every observer of what transpires between the photographer and his customer must reveal this one peculiarity—that which is pronounced too much for all other pictures is entirely insufficient when applied to their own particular case.

While I am willing to admit these are notable exceptions, it is nevertheless true that events similar to the foregoing enter more or less into the experience of every photographer; and this is only one class of advocates for excessive retouching. There are thousands who boldly confess that they wish their pictures made beautiful—all the lines, wrinkles, freckles, irregularities, and imperfections, not modified, but removed. For this they are willing to pay any reasonable price, but will accept nothing short of this, leaving us no alternative between "legitimate photography," idleness, and poverty, and skilfully retouching negatives, with liberal patronage and consequent prosperity. I think I am justified in recommending the latter.

But the objector, "having put his hand to the plough," refuses to look back; he returns to the contest with the assertion that when so much reliance is placed upon the skill of the retoucher the duties of the closet and operating-room are neglected, and inferior negatives the result. This, in many cases, is but too true; but I claim that in no case is it necessarily so. I think every conscientious photographer will agree with me that each negative should be made with as much care as though the art of retouching was unknown. To do less than this would be like unto a machinist who would omit a vital part in the construction of a locomotive, because he knew it was to be entrusted to the hands of a skilful engineer.

Having endeavoured to call your attention to the necessity of retouching negatives, and also to show that there is a demand for a great deal of it, I now proceed to a consideration of the best method of accomplishing the work, and I am admonished by the too great length of this paper, and the fear of occupying too much of your valuable time, to confine myself to an enumeration of the various devices employed, trusting that before an end of this discussion is reached we will be favoured with valuable suggestions from those who have devoted time to the consideration of the subject, or made this branch of photography a speciality.

So far as my knowledge extends there are three methods employed in this city, each possessing some advantage over the other, which we can ill afford to dispense with, and each having some objectionable features which it is the object of this discussion to overcome.

First on the list I will place the oldest and most-commonly-employed process of retouching on "gum," which admits more free use of the needle in making erasures, by which more extensive alterations may be made in a negative than by any other means known to me, but which also presents the difficulty of so matching the opacity of the negative in the parts surrounding the pencil-work that the subsequent varnishing will not lose the opportunity to print in light spots; and I apprehend that the only remedy will be found in selecting a grade of light and shade, and a delicacy of touch, which aims not at prodocing a finished negative, but makes due allowance for the inevitable changes produced in the thickness of the film by the subsequent varnishing. If the members of this Society are true to themselves the *how* to best accomplish this desideratum will be made plain by our many able practitioners.

Second: as to retouching on varnish which has been previously ground with pumice-stone or other grit. One conspicuous advantage of this is that no subsequent process is necessary which changes the value of the work done, the negative passing to the hands of the printer in the same condition that it leaves the retoucher; the film once being matched by the pencil it so remains. The importance of this can scarcely be over-estimated, and at first sight seems to be all that could be desired; but we are met at every hand by necessities which this method fails to meet, to wit, removing or reducing light portions of the negative, such as changing the lines of a cheek, the mould of a shoulder, the taper of an arm or finger, &c. A varnished negative offers a most unpromising surface for the use of the needle or other reducing agents, besides involving the risk or almost certainty of the film scaling off round the erasure. The grinding also increases the printing power of the negative in the parts ground, destroying its harmony, which, however, might be partially remedied by acting on the valuable hint thrown out by Mr. Winter at our last meeting, in his remarks on strengthening the shadows in the face by applying gum with a small brush. There is much for us all to learn on this subject. Now is the time, and this is the place, for us to make common cause against ignorance. Let us each enjoy the advantage of our accumulated experience. Let it be our proudest boast that we have contributed to and encouraged a train of thought by which we have all become wiser, and better fitted for our difficult duties, without loss to any.

Lastly: retouching on "chill" or "grit-varnish." This method has much which commends it to my favourable consideration. The negative is left, after varnishing with "ground-glass" surface, favourable for retouching. Its printing power is uniformly increased; but, as in the preceding process, a radical change in the negative is difficult, if not impossible. As the traveller at the forks of the road, upon inquiring which was the best, was told—"No matter which you take you will wish you had taken the other;" so have I ever found it in retouching negatives. The difficulties present themselves in such vast numbers, with constantly-accumulating force, that we are periodically seeking refuge from pressing ills by adopting the previously-discarded methods, vainly hoping to effect a transfer of advantage of one process and an evasion of the obstacles of both. Having endeavoured to set forth the necessity of retouching negatives, referred to the most commonly-practised methods employed, and called attention to some of the more prominent impediments which hinder our efforts in advancement, I leave a more full and complete elucidation of the details in the hands of those who, by constant devotion to this particular branch, are better qualified for this duty than myself.

In conclusion: might I be permitted to digress for a moment or two? During the success of this Society I have been solicited by members to look with favour upon a plan of "qualified competitive exhibition" of photographs. I felt, and still feel, compelled to refuse adherence to this or any other scheme which would, in my judgment, deprive me, in common with other members, of the largest possible advantages growing out of these meetings; and, in order that I may not be considered supercilious, and hoping some may be found who agree with me, I desire briefly to state a few of the reasons.

First: in order to maintain this organisation in its present state or efficiency its meetings must be both pleasant and profitable. Let me ask —Is defeat so pleasant a thing that we should provide for all but one or two, or even three, of our members being defeated in their efforts to gain a prize at each meeting? Would not the advantage to those gaining the prize be more than an offset by the discouragement, discontent, and absence of those who were persistently defeated? I think our very brief experience in this direction justifies the conclusion that it would.

So much for retouching. And on the score of profit, how can we hope to make these meetings profitable if we offer a preminm for concealing our best methods? For who, with the single desire of gaining a victory over his fellows, would be willing to disclose the means by which he hoped to obtain it? I hold that the only success worthy of this Society, the only object of calling it into existence or prolonging its days, will be found in our fostering friendly social intercourse, discouraging all business asperity, and securing to those who attend these meetings an amount of pleasure and profit which will prove an adequate compensation for absenting themselves from their friends and families.

W. H. Rulofson.

LANTERN PICTURES.

The Association.—Our Journey North.—The First Night.

On through the night we speed. Looking on this picture you will observe that we are comfortably seated in a railway carriage, and that the little table on which the roof-lamp reflects its sombre light is composed of legs covered by railway rugs. We who are speeding on to the seat of science are now enjoying a quiet game of whist to while away the time. "There are only three players," you observe. Exactly so. I myself am the fourth, but have just stepped aside to describe the picture to you.

That puts me in mind of a story told of Harry Webb, the actor. He, having got up a new witch scene for the play of "Macbeth," seated himself in the gallery on the first night of performance to see how it looked. He there observed that only two witches came on instead of three. When angry he hissed through his closed teeth a sound like the escape of steam from an engine. Blowing off his wrath in this way he rushed down to the prompter's box, exclaiming—"Where the devil is the third witch?" The prompter quietly remarked, with a smile—"Why, you're the third witch yourself, sir!—you're dressed for it." "By heavens! so I am," he exclaimed, and rushing on with the words—"A drum! a drum! Macbeth doth come!"—so saved the scene. But this is digressing.

The compartment being close and warm we do the Bohemian by casting off our coats and sitting in our shirt sleeves. Hendry rather likes it, for he has just returned from America, and the very thought of the broiling which he endured in the land of the west makes the perspiration gather in dewy beads upon his brow. He seems in goodly company. See how familiarly he treats the kings and queens, and he is quite at home in the handling of a knave. Little Jim plays cautiously and well. My partner and I being pretty equally matched, we all feel happy as the time and train race on.

By and by the oscillation of the carriage—like the rocking of a cradle—makes our eyes feel heavy, and over the odd trick we drop the cards and our heads go moving uneasily from side to side in a troubled sleep. Morning brought us to Glasgow and the seat of the British Association meeting.

The city is choke full, and every hotel is crammed. We stand at the office window of our hotel—*our* hotel because we intended to stay there. We are informed that Hendry can have a bath-room, and little Jim can have the top of a billiard table to roll about on, whilst I could find accommodation in a room along with another gentleman. Next morning we compared notes.

Hendry told us that he would not sleep again in a bath-room for a hundred pounds. The shower apparatus not being tight, it kept drop, drop, dropping through the whole weary night. He began to calculate how long a time it would take at the same average fall to wear a hole in the bottom of the bath. If one were condemned to listen to this continually, he thought, how many months would it take to produce incurable madness? Wearied out with speculations he at last fell

fast asleep. Then, with a start, he woke in the midst of a troubled dream. The bath had filled, and with all his energy he was swimming across the channel for a wager of a thousand pounds.

Jim had been indulging in a *pool* of another kind. All the night through he had been knocking the balls about, until he had lost all the money of which he was possessed.

I had the unkindest fate of all. I slept in the room with the other gentleman. This gentleman, "from his brogue," was evidently a native of Ireland, but had been some years in America. I entered the room quietly for fear of disturbing my sleeping brother, when I observed a tall spectre seated up in bed who exclaimed—"Hail, Columbia!"

Why Columbia should be hailed at that particular moment I could not make out, so I replied with a "Good evening, sir."

"I am glad you have come, stranger; I have been waiting for you considerable."

"Indeed," I said.

"Yes; all through my weary life I have been engaged in midnight studies. Tonight you are the subject matter."

I was feeling cross and sleepy, so, putting on a fierce look, I said—"Go to sleep, old man!"

"No, no," he replied; "you must know with whom you have the honour to sleep." With one of his braces that lay on the bed he began to pull up his trousers, which were lying on the floor and to which the brace was attached. Drawing away at the brace, like raising a bucket out of a well, he reached his trousers pockets, from which he produced a piece of parchment about the size of the page of a newspaper. Spreading it out on the bed, and pointing to it, he said—"Stranger! look here! This will inform you that I am an American citizen. Will you be good enough to read it?"

Well, the fact was it would have taken an hour to read it through, so to soothe him I said—"I'll have a look at it in the morning. I'm too sleepy now. And I yawned, just to show him how much I needed rest. It was no use—

"No time like the present, sir," he continued. "See here. That is my name—Olive Brown, Professor Olive Brown. I am a professor of mathematics. You might have some doubt about it, sir; but I can assure you that I am one of the most scientific men in the world."

At this point I take off my coat.

"It has been stated by the President of the United States that he never met a smarter man."

I take it for granted, and undo my collar and tie.

"The many subjects on which I have written have been the means of electrifying the world."

I pull off my trousers and put down the gas.

"New lights on every subject, sir. I do not speak in vanity, stranger, when I say"—

I tumble into bed—

"When I say that I have written more books than any living author. I have written on engineering, electricity, magnetism;" and with the sound of his voice still repeating—"hundreds"—"books"—"volumes"—"genius"—I fell asleep.

I started up in the morning with the words still ringing in mine ears—"Author of a hundred books, stranger." I looked up, to find my friend Hendry button-holed by the maniac whose bedroom I had shared, and Hendry did not seem to enjoy it by the expression of his face. He had come up to see what kept me in bed so long, and so had been caught in the Olive Brown trap.

"Look here, Mark!" he said when he observed that I was awake; "get up out of this—quick! make haste! or this Brown will give me the blues."

The author of an hundred volumes said no more, and we escaped.

Mark Oute.

Meetings of Societies.

MANCHESTER PHOTOGRAPHIC SOCIETY.

The first meeting after the holidays was held at the Memorial Hall, on Thursday evening, the 14th instant,—Mr. G. T. Lund, Vice-President, in the chair.

The minutes of the former meeting were read and confirmed.

Mr. James Young read the following letter, handed to him by Mr. J. B. Payne, who was unable to attend:—

"8, *Maddox-street*, *August* 4, 1876.

"Dear Sir,—Thanks for your letter concerning the development of my plates. I am glad to find the hardening of the water has proved effectual in your case as well as in all cases where the water has been too soft. I sent the letter to The British Journal of Photography as being the best mode of bringing it before the public; at the same time I requested that the name of the gentleman sending it to me should not be mentioned, as, had it been, he would have been inundated with letters. I suppose the Editors thought if my name had appeared it would have been advertising me, so they left mine out as well. I have many letters from all parts of the country informing me, since using only spring water, that blistering and frilling has quite disappeared.

"I will now give you another 'wrinkle,' which answers the purpose of the hard water, with the further advantage of giving density at the same time, and prevents ammonia stain. It is this—when developing your picture add to the pyro. one-third of *table beer* (not porter). I will give it to you as I use it myself in mixing my pyro.:—I put five instead of four grains of the pyro. to the ounce of water. I then pour out two drachms of pyro. into the developing glass, to which I add one drachm of the beer. I then add the *full dose* of the bromide and ammonia, and, after soaking the plate as usual in water, I commence the development by pouring on the beer and pyro. It generally takes a little longer before the image makes its appearance. As soon as it does add a drop of the plain ammonia and water. Density can now be got without risk of stain.

"Again: if you have a thin negative requiring intensification—*i.e.*, after fixing and drying—flood the plate with the acid pyro. of the formula, to which has been added some beer—quantity about one-fourth part. Drop into the developing glass a drop or two of the silver; pour back from the plate the pyro. and beer, and then again on to the plate. Intensification now goes on without fear of stain, the shadows being kept beautifully clean. In this way you can intensify to make your negative print purely black and white. It answers admirably where you want to copy engravings, printed matter, maps, &c.

"Mr. Young, I think, had a transparency taken from a print—or, rather, the negative was taken from a print. Both the negative and the transparency were treated in this way. The slow plate, I find, answers better for this kind of work than the rapid or ordinary.—Yours, truly, "R. Kennett.

"P.S.—If you think the above worth communicating to your Society, pray do so. It may be of service to some who may be experimenting with gelatine emulsions.—R. K."

Messrs. Wade and Coote were elected auditors.

Mr. Lund exhibited some prints from negatives taken at Alderley on the 12th August—the twenty-first anniversary of the Society. Mr. Lund used both collodio-albumen and gelatine emulsion plates.

Mr. Chapman exhibited one of Hare's automatic changing-boxes, and also Mr. Woodbury's scenograph and stand.

Mr. James Young exhibited two of Kennett's gelatine emulsion negatives.

Mr. Coote showed some exceedingly fine collodio-albumen negatives, and also some negatives on Liverpool emulsion plates, taken during his recent trip to Ireland.

Mr. Noton said he had an improvement to offer on the albumen distributor he published eleven years ago. The filtration of albumen had always been a difficulty with him, unless it had been considerably diluted. The fresher the eggs and the less water used the slower it was in passing through the calico—sometimes not at all. Occasionally the settled albumen had been decanted into the distributor from the glass jar in which it had been beaten up; but this was liable to create bubbles. The albumen was now beaten up in the distributor itself, and that was the improvement alluded to. Filtration being dispensed with, time was saved, and thinning of the albumen not required, beyond a determined quantity, for dissolving any salts. In the apparatus on the table he had substituted an ordinary glass gas globe for the other form of container, the smaller opening at the bottom being closed by a cover of gutta-percha, the thickness being about three-sixteenths of an inch. The disc was softened in hot water, the edge squeezed and pulled out thinner, and, while hot and soft, applied to the opening, turned down over the flange, and tied with string, similar to the paper cover to a jar of preserves. The joint being perfectly firm and watertight when cold, a hole was made for the valve as usual. A thread is tied to the top of the valve, the other end being brought over outside the globe. During the beating the valve and thread are kept away, the tube being stopped up by a small wood plug at the end outside. When the albumen froth has settled down to a liquid the valve may then be put into its place, the wood plug being drawn out. He had not beaten up more than five ounces, but he had no doubt double that quantity might be done at once.

A vote of thanks was passed to each of the gentlemen who had contributed to the evening's entertainment, and the meeting was then adjourned.

Correspondence.

WHITE LIGHT IN THE STUDIO.

To the Editors.

Gentlemen,—The question as to whether white light, or any modified form of it, could be used in place of the yellow light in the operating-room having been lately brought forward in your Journal, I beg to offer you my experience in that direction.

About twelve months ago I determined to try what amount of detriment might be caused to the portrait I had just developed by opening the window and admitting the daylight upon it after its being previously well washed under the tap. I then intensified, fixed, and washed, and found, to my great delight, that there was not the least sign of fog or stain. Since that time I have always opened my window immediately after washing off the iron, and have finished the rest of the work by the daylight coming in through the open window of the operating-room.

As the image developed by iron comes out only in proportion to the exposure, it is of no consequence to watch it during development,

and any light which will show what is going on will do for that; but the intensification is a different thing, requiring to be carefully done to avoid going too far, and it is only possible to do that properly by daylight. I trust your readers will be induced to follow my example. I am sure they will be satisfied with the results.

Before concluding I may just add that I do not use acetic acid with the iron (or pyro.)—only plain water and spirits of wine, to make it flow freely.—I am, yours, &c., JOSEPH BYRNE.

43, High-street, Margate, September 25, 1876.

THE PHOTOGRAPHIC EXHIBITION.

To the EDITORS.

GENTLEMEN,—I note your remarks on the exhibits sent from Chatham, and labelled as coming from the Royal Engineers. Last year the mistake in designation arose from bad cataloguing, and I wrote to have it corrected, though without effect. This year, through my absence, the pictures were sent labelled as in the catalogue, though the addition of "Chatham" was affixed.

Allow me to state that the pictures were produced by the Royal Engineers' School of Photography, Chatham, of which I have the honour to be in charge, assisted by Quarter-Master Sergeant Doyle and an able staff, all of whom I am proud to say have been trained during my term of office. It would be impossible to fix more definitely to whom belongs any credit that may attach to the production of the pictures, which, if I may say so, are the results of a definite part of the instruction carried out.—I am, yours, &c.,

W. de W. ABNEY, *Capt.*, R.E.

School of Military Engineering, Chatham, September 25, 1876.

P.S.—The sharp negative to which you allude, as well as all the originals of the enlargements, were taken by myself at different times. —W. de W. A.

EXCHANGE COLUMN.

No charge is made for inserting these announcements; but in no case do we insert any article merely *offered for sale*, that being done at a small cost in our advertising pages. This portion of our columns is devoted to exchanges only. It is imperative that the name of the person proposing the exchange be given (although not necessarily for publication, if a *nom de plume* be thought desirable), otherwise the notice will not appear.

A 14 × 14 mahogany camera, by Bland, and two dark slides, very little used, offered in exchange for a good rolling-press.—Address, HENRY IRIS, 10, Upper-street, Islington, London.

Mahogany 4 × 7½ binocular camera and pair of lenses, by Murrell, in exchange for a good quarter-plate camera and instantaneous portrait lens.—Address, with particulars, F. A. BALLARD, 19, Mornington-road, Regent's-park, N.W.

ANSWERS TO CORRESPONDENTS.

☞ *Correspondents should never write on both sides of the paper.*

NOTICE.—Each correspondent is required to enclose his name and address although not necessarily for publication. Communications may, when thought desirable, appear under a *nom de plume* as hitherto, or, by preference under three letters of the alphabet. Such signatures as "Constant Reader," "Subscriber," &c., should be avoided. Correspondents not conforming to this rule will therefore understand the reason for the omission of their communications.

S. E. R.—Use india-rubber cement.

C. MAGRAVE.—See a leading article in the present number.

WILLIAM KERMODE (Durban, Port Natal).—Post-office order received. Thanks.

IN A FIX.—By sending eighteenpence in stamps our Publisher will forward you the numbers containing the information required.

NEAPOLITAN PHOTOGRAPHER.—We shall look out the Journal you require, and forward it as directed. We shall be glad to receive the views mentioned.

P. C.—You must trust to the character of the dealer. If you forward any second-hand lens to our office for examination we shall be glad to give such an opinion as we are able to offer.

ENSIGN.—We refer you to the manual of Mr. Jabez Hughes, or any other manual of a similar character. We do not give elementary lessons in photography in the column devoted to "Answers to Correspondents."

X. Y. Z.—Use a freshly-iodised collodion; at anyrate do not allow more than two days to elapse between the mixing and the using of the collodion. If this do not prove a remedy for the evil of which you complain write again.

FRITZ.—What is wanted for the toning-room is a diminished or softened white light of such degree of intensity as just to enable you to see properly. Strong light will invariably cause the gold to be reduced, and to this is to be attributed the pink colour obtained. The Photographic Exhibition will close on the 14th November.

FREDERICK DOUGHERTY.—The print enclosed has not been properly fixed. This may have been caused either by the hyposulphite of soda solution being too weak or by the print not being allowed to remain in it for a sufficient length of time.

G. W.—We regret that we are quite unable to give any further information respecting the formula made use of by Mr. Willis in the preparation of his platinum pictures than that already furnished when we published the specification of his patent.

C. W.—To test the acidity of your albumenised paper, put a small piece into a test tube filled with distilled water, and apply a very gentle heat—just sufficient to dissolve the albumen without causing its coagulation. In this water immerse a slip of litmus paper, and note the result. Should the paper prove to be acid, try the effect of fuming it with ammonia.

AN OLD DRY-PLATE PHOTOGRAPHER writes us a letter in which he expresses his appreciation of the of the sensitive negative tissues prepared by Mr. L. Warnerke. He finds them more easy to work and more certain in their results than several kinds of sensitive dry plates he has tried. We could not publish such a letter as that of our correspondent unless he attached his name to the communication.

C. P. (Manchester).—1. It is always better, in such a case as that described, to have the diaphragm outside the lens. This will ensure your obtaining greater flatness of field than if the lens were placed nearest to the view to be taken.—2. It is a recognised principle that the shorter the focus of a lens the more dwarfed will be the distant mountains reproduced by it, and *vice versâ*. Both pictures (that is, those taken by the short and by the long focus lens) will be equally correct in the perspective; but, as you have seen, one conveys a more truthful idea than the other.

A. L. B.—There is just this difficulty—that while it is always better the sitter should face the north, in your case the high houses at the north end may, from their altitude, cause the top light to predominate in too great a degree. It is of little consequence whether you make the ridge in the centre or not; but it is of importance that it be made very thin, so as not to obstruct the light. For glazing use thin ordinary glass, selecting a sample of a *very pale* green colour. Louvre boards, if well made, will answer best for the side lights. A note addressed to the Howarth Stove Company, Lister Hills, Bradford, will receive attention.

DRY PLATE.—Our correspondent, who is an experienced dry-plate worker, in the course of a note on various subjects throws out a hint which may be useful. He says:—"I am much pleased with your article on *Development and Half-Tone*. I find, as you say, that the alkaline developer, with *proper exposure* for the developer used, will frequently give results equal to the best wet plates, but the difficulty appears to be in getting the right exposure; and I think many amateurs would prefer giving longer time and using the acid pyro. if it could be successfully worked with the bromide emulsion. In my experiments I have always found that when acid pyro. was used it was necessary to have a combination of iodide and bromide. It would probably be an advantage if amateurs could purchase an emulsion containing both iodide and bromide, or, better still, the two separately, and mix or not as required. Of course in working albumen, coffee, &c., a weak alkaline pyro. is very useful in first bringing out the image, but if carried too far it will flatten the picture."——With regard to a query respecting the mounting of two single lenses so as to form them into a doublet, we must remind our correspondent that, if these lenses be of the usual form adopted for single landscape combinations, they will not combine so as to make a doublet that will give a flat field, unless a very small stop be employed and the distance between the two be so great as to give a very small area of illumination. Subject to this drawback the lenses may be combined, the smaller one next the front. By the following rule the exact focus of an objective, resulting from the combination of any two lenses, will be readily ascertained:—Let the two focal lengths be *added* together, and from this substract the distance at which the lenses are mounted apart. Next *multiply* together the two focal lengths, and divide this latter quantity by the former. The result will be the equivalent focus of the lens. By working out this rule it will soon be discovered that the closer together the lenses are mounted the shorter will be the focus, and *vice versâ*. The knowledge of this rule is of much use when it is desired to effect an adjustment of a pair of stereoscopic, portrait, or other compound lenses which are not quite matched in respect of their foci.

PHOTOGRAPHERS AND ROYALTY.—Who would venture to speak disparagingly of the social status of photographers when we find that, at a ball given by Her Majesty at Balmoral during the present month, the Messrs. Downey, who were engaged there in taking photographs, received an invitation to be present and "trip the light fantastic toe" among the scions of royalty? Speaking of royalty, we learn that Mr. George Cooper, of Hull, has recently been photographing groups of H.R.H. the Prince of Wales and party, at the residence of Mr. C. Sykes, M.P.

CONTENTS.

THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 857. Vol. XXIII.—OCTOBER 6, 1876.

MR. JOHNSTON'S NEW EMULSION.

In accordance with the promise made last week we are now in a position to lay before our readers some further information respecting the above process, though, owing to the length of time required for the emulsion to become fit for use, we have not yet had an opportunity of testing its working powers.

The chief novelty, as our readers will have noticed, is the substitution of a "new salt" for the silver nitrate usually employed; but, n addition, there are many other minor differences which we shall notice as we proceed. The so-called new salt, of which Mr. Johnston has supplied us with two samples, consists mainly of silver in combination with ammonia; but its exact composition and how it is prepared Mr. Johnston has not yet explained.

The use of the double salts of silver and ammonia in photography is by no means new; but, although this course has been suggested, we are not aware that such a salt has ever been actually applied to emulsion work. Therefore, should practice prove that any advantage is gained, Mr. Johnston must be credited with the honour of the discovery.

In the absence of precise information as to the composition of the new salt it would be next to useless to speculate upon its probable nature, so we shall merely give a brief description of its physical characteristics and some of its chief properties. The two samples supplied to us by Mr. Johnston were widely different in appearance, which might arise either from difference in composition or, more probably, from variation in the preparation of the salt. Both samples were similar as regards the shape of the crystals, which are long and acicular, remarkably unlike the well-known tabular crystals of silver nitrate; but in one case the individual crystals were very much larger and cleaner than the other, as if they had been formed at a lower temperature. Both samples have a slightly moist appearance, as if the salt had deliquesced to a small extent or had been originally imperfectly dried; but whether this is one of the natural characteristics of the salt or merely an accident we are not yet prepared to say.

Another point of difference exists in the colour of the two samples—one of which is nearly white, while the other has a very decided grey tinge, as if it had been acted upon by light; this, it may be remarked, is the sample exhibiting the greatest signs of moisture. This sample is stated by Mr. Johnston to have been originally perfectly white, but has gradually acquired its present colour, while the other is little, if at all, changed. This last fact points to an item of uncertainty in the manufacture of the salt which ought to be seen to; for it is obvious that, if one lot be perfectly stable and the next liable to change, no reliance can be placed on the uniformity of results to be obtained. Mr. Johnston ascribes the effect to the evolution of a portion of the ammonia and the oxidation of a corresponding quantity of silver, but how induced in the one case and not the other he does not attempt to explain.

We have not yet had time to examine tentatively the chemical properties of the new salt, so leave that portion of the matter for Mr. Johnston to explain in due time. From what we have been able to see of it in use we do not anticipate any difficulty in its working. It is very soluble in water, and absolute alcohol appears to take up a much larger quantity than of pure silver nitrate. A noteworthy fact, and one which may throw some light upon the peculiar action of the salt, is that if a soluble haloid be added to a solution of the double salt, silver haloid is formed with evolution of ammonia. This would point to the supposition that the ammonia does not enter into combination with the haloid or take any part in the formation of the sensitive layer; but as we are unacquainted with the composition of the collodion we must suppose that its function may lie more in that connection.

Turning, now, to the collodion: we have two different samples—one containing bromine, the other plain. The first thing that strikes us is the extraordinary thickness or viscidity of the collodion; but this is, perhaps, not to be wondered at after reading Mr. Johnston's formula, which gives twenty-five grains of pyroxyline to each ounce of solvents. The plain sample as we received it is simply a stiff jelly, the other being much thinner, owing, no doubt, as Mr. Johnston states, to the action of the bromine upon the cotton. Of the latter we may say that it requires to be treated with due respect; for a few minutes after unpacking the bottle it burst, and, though some distance away at the time, certain of our garments will bear testimony to the powers of the collodion in at least one direction.

In sensitising the emulsion we endeavoured, as far as possible, to follow Mr. Johnston's directions implicitly; but experienced some slight difficulty in securing a respectable emulsion. We were compelled to add, in addition to the quantity of alcohol directed by Mr. Johnston, two drachms per ounce of ether before the emulsion would form at all, and even then there appeared to be a "lumpiness" about the mixture not at all, to our ideas, consonant with a workable film. However, as Mr. Johnston states that *age* is required in order to produce a structureless film, we must wait a few days for the happy result, and not condemn the emulsion untried. As regards colour and other physical properties, as far as we can judge by mere appearances, the emulsion seems to be likely to give a satisfactory result; but until it arrives at a workable state we must suspend judgment as to its capabilities.

We are unaware whether there is any peculiarity in the preparation of the collodion with which we have been supplied, or whether the novelty rests entirely in the employment of the new double salt; however, next week we hope to be able to give the results of a trial of the new salt with an ordinary collodion.

THE PHOTOGRAPHIC EXHIBITION.

[Fourth Notice.]

A large picture, entitled *Yes or No* (119), by Mr. J. M. Young, is remarkable from the fact of its having been composed from fifteen negatives. It represents a young lady who, taking advantage of leap year, has jokingly "popped the question" to her admirer, the latter appearing to be in a state of profound contemplation with regard to the reply to be given. Both are dressed in costumes peculiar to a fishing village. Mr. Young also exhibits several fine single figures (129, 151), which we much prefer to his picture of *Yes or No*.

The portraits by Mr. A. Boucher, of Brighton, are very numerous, and in general possess great merit. The faces are charming examples of the retoucher's art, in which connection, and as possessing other good qualities, we may mention a group of two ladies in the frame numbered 134.

The *Old Weir on the Liffey* (92) is an excellent example of the artistic work of Mr. George Mansfield, who also contributes several other beautiful views from nature.

Mr. Slingsby's deservedly high reputation does not wane in the slightest degree. *Master Trollope* (109) is a fine, truthful portrait of a smiling schoolboy with a music book under his arm. It has, however, been taken with a lens which is imperfect for work of this class, the lower extremities being blurred and indistinct. His large portrait of *G. H. Shipley, Esq.* (137) is probably the finest portrait Mr. Slingsby has ever contributed to the Society's exhibitions. Three separate portraits of children (respectively 182-6-8), of large dimensions, are deserving of the most careful examination.

A frame of four whole-plate portraits, by Messrs. W. Barry and Co. (126), exhibits careful work. These artists contribute other portraits besides those specified.

Mr. Woodbury's pictures of Pompeii, Amalfi, and other Italian views (106) are most charming. Where exists the enthusiast who would not wish to have such pictures in his or her scrapbook or folio?

The professional portrait photographers of London seem to be very loath to exhibit their productions. Is it because they feel that they have but a feeble chance in a competition with their *provincial* brethren that they are so reserved, and refrain from showing the world what they can do? From whatever cause, the fact remains that they have not thought fit to send pictures to an exhibition where their works would run the risk of comparison—perhaps unfavourable comparison—with those of some country village artists. The two or three London portrait photographers who *have* sent their works are therefore entitled to higher commendation, inasmuch as they are not afraid of their productions being estimated from the provincial standpoint. We notice with pleasure among these a frame containing a number of finely-executed portraits by Messrs. A. and G. Taylor (139), in which are several subjects very difficult to delineate correctly by photography, the portraits being either of natives of India or of those who have become bronzed from a long residence in an oriental clime. These portraits by Messrs. Taylor are alike excellent in pose, lighting, and execution.

The various exhibits of Mrs. S. G. Payne display fine taste. We have at a previous period spoken of this lady in connection with the introduction of *entourage artistique*. There are several specimens of this kind of floral border to be seen in the Exhibition, notably in the frame numbered 145. Mrs. Payne also exhibits other pictures of gracefully-arranged flowers, among which we may mention *A Design for a Drawing-Room Panel* (103), *A Design for a Lady's Fan* (337), and others.

Mr. Vaughan's picture, entitled *A Junior Member of the Society of Female Artists* (136), is well executed. The subject is composed of a little girl armed with palette, colours, and brushes, standing before an easel on which is represented a landscape subject, presumably the work of the tiny "female artist."

Mr. R. Faulkner contributes again this year a frame of those dainty portraits of children in the execution of which class of pictures this artist is *facile princeps*. We shall not attempt to criticise these charming specimens of Mr. Faulkner's pictorial work; they must be seen to be adequately appreciated. In addition to these, Mr. Faulkner exhibits several delightful portraits executed on opal glass by the peculiar method of printing associated with his name, which has already been brought before the notice of the public. Our little quondam friend *Dorothy Morrison* is, without doubt, the "belle of the party," if we may include under this designation the various artistic portraits in separate frames exhibited by Mr. Faulkner. Her portrait is one of the most exquisite ever exhibited on the walls of the room in which her "counterfeit presentment" now finds a temporary resting-place

We must here conclude for this week our notice of the Exhibition.

NOTES OF A RECENT VISIT TO GLASGOW.

No. III.

Who that has made inquiry into the most recent developments of those still imperfectly-understood sciences—mesmerism and psychology—will not have heard of the name of David Duguid, of Glasgow, of whom it is stated that he is able to paint pictures in the dark? It need scarcely be said that among the various things of interest to be seen on the occasion of our visit to the western capital of Scotland the almost miraculous performances of Mr. Duguid occupied a distinctive place in our note-book. Who is David Duguid? He is a photographer, or rather a photographic assistant of Mr. James Bowman, of Jamaica-street. What his special gifts are will be revealed in the course of this article.

As the result of the friendly services of Mr. Bowman we, together with several friends whose names will hereafter be given, were privileged by having an interview with Mr. Duguid in order to witness a display of his marvellous powers. We found him to be a man in the prime of life, of a singularly bashful and retiring disposition, his head exhibiting an almost abnormal degree of development in what phrenologists style the intellectual regions.

The reader must imagine, then, a small party of persons seated round a room limited in extent, in the centre of which was a table, the hour being eight o'clock in the evening. On this table was placed a box of oil colours in tubes, a palette, brushes, and a few *carte-de-visite* mounts which had been coated with collodion for the purpose of preventing oil colours from being absorbed or running. This, we think—for on this point we quote from memory—had been a previous suggestion either of Mr. A. L. Henderson (of London) or of some one competent to give practical advice on such a matter; but its importance will be seen in the sequel.

A mount was removed from a few that had been placed in a case so as to be easily reached, and, on the suggestion of Mr. George Mason (of Union-street), a small piece was torn from the corner and placed in our keeping. This was for the purpose of identifying the card at a future time. We, however, adopted a different method of securing such identification. When collodion is poured upon an enamelled, coloured card it invariably runs in certain streaks. The nature and position of the streaks on the card in question we noted very carefully, so as to be able to recognise it among others. Mr. Duguid, after sitting still for a few minutes—during which time an active conversation on anthropology, the Servian war, the weather, and other congenial topics was carried on—appeared to fall into a quiet sleep, which Mr. Bowman said was a state of trance. The light was now extinguished, and during the period of obscuration Mrs. Mason, by request, sang in a most charming style a favourite Scotch song, the conversation previous to this musical episode being carried on as before. After a brief period the light was turned on, and the card that had been marked and noted in the manner indicated was found to have had painted upon it, in oil colours, a lovely little sketch of a river or lake scene—a castle or fort, with trees on the right bank, a jutting bank on the left, mountains in the distance, and a steamer proceeding down the river. The painting was contained within a well-defined space marked by a pencil. It is now in our editorial office, and may be seen by any who choose to call for the purpose. It has already, we may state, been seen and intently examined by several artists, who state that there is a certain "style" about the picture indicating that its producer is a clever artist. But this was not all; for on a second card, now in the possession of Mr. Johnston, of Glasgow (who was present, and whose name in connection with the introduction of the Lambertype process in Scotland is not unknown), was also painted, the image in this case being quite circular. Two other "manifestations" followed in pencil—one being a landscape sketch (retained by Mrs. Mason), the other an extract from *Paradise Lost*, which may be seen at our office.

When the light was again turned on, Mr. Duguid appeared as before, viz., quite insensible. By what means were these paintings and drawings produced? We offer no opinion whatever. But of one thing there is no doubt—they were produced in the dark. Messrs. Downey (of Newcastle) and Mr. J. G. Tunny (of Edinburgh)

were present on the second evening when these remarkable occurrences took place. To these gentlemen Mr. A. L. Henderson explained that he had on a prior occasion seen Mr. Duguid at work with his eyes closed, and he (Mr. Henderson) not only interposed an opaque sheet of paper between the painter's eyes and his work without causing any change, the painting being proceeded with as before, but that he had suddenly turned down the gas when the painter, palette and brushes in hand, was approaching the easel to commence work, as suddenly turning up the light after a few minutes, only to discover that the artist had been all the while proceeding with his work as if nothing had happened. It should here be recorded to the honour of Mr. Bowman and of Mr. H. Nisbet, who seemed to possess a friendly influence over Mr. Duguid, that everything they could do to facilitate the investigation of this strange matter by members of the British Association was done.

If it be asked, How is it done? we answer simply that we do not know. We have made free use of the names of persons present on both evenings, and we refer those desirous of ascertaining more than we have here detailed to one or other of those gentlemen, who, we feel assured, will blame us for *under-stating* what took place. These phenomena must prove an interesting subject for investigation by the curious in matters anthropological. We have omitted to state that Mr. Duguid's hands were firmly tied throughout this "dark *seance*."

The interesting paper read by the Rev. H. J. Palmer, at the last meeting of the Liverpool Amateur Photographic Association, shows that the persevering efforts of that gentleman in connection with gelatine emulsions are bearing good fruit. The question of organifying emulsions, whether of gelatine or collodion, is by no means a new one; but the value of the practice is gradually forcing itself into greater prominence. As an adjunct to the gelatine emulsion the organifier is, perhaps, even more useful than with collodion, as it is probable that in the former case it exercises a function which is not necessary in the latter, namely, the preservation of the gelatine film from atmospheric influences. Gelatine in a perfectly dry state may be looked upon as a constant substance, and quite free from any liability to spontaneous change, and, when in such a state it forms the basis of a sensitive film, such film may be fairly considered as possessing in a high degree the property of stability; but, unfortunately, it is scarcely possible to secure the constant dryness necessary to retain the gelatine film in its best state, and the presence of even the most minute traces of moisture entail almost certain decomposition. For this reason it is important to discover some agent which, without materially affecting the photographic properties of the film, shall so modify its physical character as to remove, or at least mitigate, the liability to spontaneous decomposition. Many methods suggest themselves for rendering the film insoluble, which would appear to be the most likely way of overcoming the difficulty; but they are all accompanied by objections of a purely photographic nature which prevent their adoption. Mr. Palmer has published his experience in the search for a suitable substance, and we hope that others of our readers will follow the example thus set them; but, whatever may be the substance employed, we would discard everything of a fermentable or hygroscopic character, as, whatever may be the immedite effect upon the emulsion, an item of future uncertainty is introduced which it is difficult or impossible to overcome.

A SIMPLE WASHED EMULSION PROCESS.

I have had several inquiries lately upon various points in the working of the washed emulsion process, and there appears to exist a great deal of uncertainty as to the results obtained. This I can very well understand under certain conditions. The great rage nowadays seems to be extreme rapidity; and in striving after that quality—good in itself, no doubt—other matters are lost sight of altogether, or at least set in the background as being subsidiary to the one great object. I have never, myself, been greatly in favour of extremely rapid plates, whether prepared by an emulsion or other process; for I have generally found that rapidity—at least exalted rapidity—entails uncertainty. On the other hand, if a comparatively slow plate will answer the purposes required, not only is uniformity of result to be relied upon, but the manipulations—from the preparation of the emulsion to the completion of the development—are rendered much more simple and easy, while the loss in sensitiveness is perhaps, after all, very much less than is generally supposed. Under these circumstances I venture to describe a simple and most reliable system of working this process, which must sooner or later, in some form or other, drive the cumbersome bath method out of the field.

The first great question in most emulsion processes is to secure a suitable pyroxyline, and where very rapid results are desired it certainly requires some judgment in procuring the necessary article; but for the purpose I have in view in this communication little trouble need be given to the cotton. Any fairly good sample, such as is ordinarily used for wet collodion, will be found to answer the purpose better than the most "powdery" or "intense" cottons obtainable; indeed, for washed emulsions a powdery cotton seems to be a mistake, the more "horny" descriptions passing through the ordeal of washing and re-solution much better than anything else. As regards solvents, I have never yet been able to discover the least advantage in using the pure as compared with methylated; that is, of course, supposing a fair sample of methylated to be obtainable.

In making an emulsion it is usually recommended to use an excess of silver, or at least during a portion of the time occupied in sensitising to allow the free silver to act upon the component parts of the collodion. In making the most sensitive forms of emulsion this is, no doubt, necessary and advisable, and in order to keep pace with modern requirements I have been in the habit of doing so myself; but there is no doubt that an emulsion so made runs a great risk of spoiling during its formation, unless the greatest care and attention be given to it, and it is also much more difficult to work when completed. In point of fact, I have come to the conclusion that the emulsion should not contain an excess of silver, even during a portion of the time occupied in sensitising, unless in the presence of a restraining acid, which latter produces an injurious effect upon the structural character of the film.

Discarding, then, the use of free silver, restraining acid, or any other extraneous acids to density or rapidity, I make a collodion according to the following formula for each ounce of emulsion:—

Methylated ether	4 drachms.
,, alcohol (absolute)	2 ,,
Pyroxyline	8 grains.
Bromide of ammonium	3 ,,
,, cadmium	7 ,,

The two bromides should be mixed together in a small mortar before adding the alcohol, which will greatly facilitate the solution of the ammonium salt. The cadmium is extremely soluble, but the ammonium, especially with strong alcohol, is rather refractory; when the two are mixed, however, the cadmium appears to facilitate the solution of the other. This collodion may be used as soon as it has become clear.

To sensitise, take for every six drachms of the above collodion twelve grains of silver nitrate; dissolve it in a test tube or small glass flask, with the aid of heat, in a small quantity of water (one minim of water to two grains of silver will be found ample), and when dissolved add one drachm of alcohol for each twelve grains of silver, heating again in order to prevent the deposition of the dissolved silver. Add it to the collodion, a few drops at a time, shaking well after each addition, and allow the emulsion to rest for some hours. Then to each six drachms of the original collodion add five grains more of bromide of cadmium, and allow the emulsion again to rest for a few hours; the cadmium need not be previously dissolved, as the collodion will take it up almost directly. The emulsion is completed by the addition of six grains more silver (to each six drachms) dissolved as above, and will be ready for use in about three hours. If the whole of the operations have been carried out carefully it will scarcely require filtration; but it is, perhaps, better to run it through a piece of sponge or cotton wool in order to be certain of the absence of spots, &c. The object in dividing the bromide and silver into two parts is to secure a finer deposit of silver bromide; but if time be an object the whole of the cadmium may be added before sensitising, and the latter operation performed at once.

When the emulsion is fully sensitised it is to be poured into a dish and allowed to remain until firmly "set." The thickness of the pellicle should not be too great or the washing will be too prolonged; indeed, it is doubtful whether the whole of the free bromide *can* be removed from a very thick layer. Eight square inches of surface for each ounce will be found to give a suitable thickness. The washing should be performed as rapidly as possible, and will be facilitated by

changing the water frequently rather than by allowing the pellicle to soak in the same water for some time. When the wash-water shows no trace, or only the *very* slightest, of silver the pellicle may be taken out, pressed between folds of linen or blotting-paper, and dried by a gentle heat. To form the finished emulsion eighteen or twenty grains of the dry pellicle are dissolved in each ounce of equal parts of ether and alcohol.

There is, I am bound to confess, nothing *new* in the above; but it has become so much the fashion to "go in" for complications in emulsion work that the simple methods are now almost forgotten. I give this formula, therefore, for the benefit of those of the readers of The British Journal of Photography who may have tried and failed with some of the "complications," feeling sure that they will succeed by following the above directions, and, perhaps, not be much backward in point of rapidity when compared with the so-called rapid methods. W. B. Bolton.

INTENSIFICATION IN WHITE LIGHT.

A letter by Mr. Joseph Byrne, in last week's issue of this Journal, introduces a subject of great practical importance, which, to the best of my belief, has never received more than a passing notice of most casual character in any public manner, and it has often been a source of surprise to me that such should be the case. The question is as to the admission of white light upon a well-washed, iron-developed plate before intensification. Does it do harm? or is it quite free from action of any kind? I really think that nine out of every ten photographers would reply—"It ruins the plate entirely, and you need not trouble yourself by wasting any more time upon it."

I remember the time well when, if a single gleam of light by any accident shot on to an unintensified developed plate, I incontinently threw it aside as a worthless essay, and at once, if possible, took another negative in its place; and that similar views are still held by the majority of photographers the dark-room practice of most operators tends to prove. One gentleman, whom I have always considered the cleverest and cleanest photographer of my acquaintance, has fitted up a beautiful little dark arrangement of shelves for half-finished negatives, for the purpose, in combination with their position in the dark room, of shutting out the faintest trace of white light.

Now for the answer to the question—Is all this necessary? I reply, only to a limited degree; for within certain bounds a well-washed, iron-developed negative may be exposed without the slightest injury to a light that would cover with fog a newly-sensitised plate. Upon after-intensification with pyro. not a trace of fog will be seen, and from theoretical views such should be the result to be anticipated. The insensitiveness of iodide of silver in the absence of free nitrate is well known, and this is an exact case in point. That portion of silver remaining on the plate after its withdrawal from the bath is in great part washed away or precipitated by the developer; and the last traces are removed by the washing the plate receives to rid it of the iron, and then we have the conditions named—iodide of silver with little or no free nitrate. There is also present bromide of silver, of which more presently.

Some time last year I was alluding to this hitherto unpublished fact to one of our leading provincial photographers, and he startled me by going much farther, saying that not only had he noticed that exposure to light was quite harmless, but that the redevelopment itself might be carried on in white light, and that such was his uniform practice, thus affording a complete confirmation of Mr. Byrne's observations. I at once, after he left me, made an experiment in this direction; but the results, though surprising enough to me, were by no means satisfactory. On other and subsequent occasions I failed to make the use of the method lead to a satisfactory end, and I have often repeated the trials, but always with similar results. I think the subject of amply sufficient interest and importance to justify me in giving details of the conclusions I arrived at, and the causes that led up to them.

When first the property of bearing exposure to light without injury became known to me I made a number of experiments to determine to what extent the exposure might be carried, and I soon found that there was a practical limit; if the light was allowed to act for too long or was too strong, the plate was spoiled. Further: unless fairly well washed the light acted in its more familiar manner of fogging at once. Here I find the difficulty of the absence of a uniform standard of light to refer to; but, by way of guide, I may say that four or five seconds of exposure to a light such as a sitter would receive in the studio on an average day would be the maximum that could be given without ill effect. Of course this is very different light from dark-room light, an exposure of minutes there with the window open not being comparable to one of seconds in the studio, owing to the usual absence of direct light. A few trials will be the best guide to one carrying out experiments in this direction; but I must interpose a word of warning, that he may not be deceived by the results.

When the light *has* acted injuriously, the visible effect in the intensified and fixed negative is not at all the light-produced fog everyone knows so well, but a subtle stain in the shadows, which might most easily escape the notice of the most practical operator, but which is none the less hurtful when the printer comes to give an account of it. This stain is of a light purplish brown colour, and is so clear and free from any grain or crystalline deposit that a negative that was entirely useless through it might be passed by as a good one if looked *through* in a dim light, and would pass muster as a good one when looked *at* in the brightest light; for it is usually by reflected light that we examine a negative for fog, with which this stain is, in effect, analogous, and its origin is the same. The best way to examine it is to expose one side only of a plate in the camera, then to develope under the usual circumstances in the dark room, wash for a minute or two under the tap, and finally to hold it outside the window to get the full effect of the light for a minute or two. Upon intensifying with pyro. no fog appears. The unexposed half undergoes a change, apparent to the eye, different from any of the common forms of stain, and the shadows of the exposed half turn a peculiar colour; but all appears to vanish in the fixing-bath. Upon holding it up to the light, however, a slight colouration can be seen in the half unexposed in the camera, but which might very easily escape notice. Let now the finger be passed across the clear film so as to remove a portion of it, and at once, by contrast, the colour of the stain is seen. Its depth, I am inclined to think, will be a surprise. The practical deduction from these observations is that a short exposure to white light in the dark room will produce no ill effect, but that a prolonged exposure may easily interfere materially with the quality of a negative, and yet its effect not be seen without close inspection.

With regard to the actual operation of intensification being performed in the light I have above stated my measure of success with it; and, seeing that the silver added to the pyro. supplies the place of that washed away, and so gives to the iodide what is necessary for sensitiveness, it is difficult at first to see what other results could be anticipated.

But there are so many differences in manipulation and in the circumstances of light in the dark room that it would not be difficult to find an explanation for results obtained by Mr. Byrne and the gentlemen I have spoken of. In the first place, collodions vary much, and one which required a minimum of intensification would be exposed for so short a time that light would not have time to produce effect enough to be noticed. Then, again, such a collodion would need very little silver to be added to the pyro.; the sensitiveness of the plate would, therefore, be very low. Again: many operators see no special advantage in having their pyro. solution very new; consequently, the red colour which age gives and the increased colour which the reduction of the silver produces act as effectual bars to the comparatively weak light of the room. This, with the low sensitiveness of the plate, would alone account for the discrepancies of practice I have noted; but, so far as my own judgment goes, I am strongly of opinion that intensification in white light can never become the usual practice of the dark room. An instance in my own practice, slightly bearing on the case, occurs to me as I write. While doing some outdoor work on one occasion my assistant wished to take an intensified negative across a court-yard to finish washing it; the greater part of the pyro. had been washed away in the tent, and under ordinary circumstances to carry the negative in the light would have been safe and proper. The sun, however, was shining, and my assistant, instead of screening the plate with his body, allowed it to receive the full strength of the rays. In less than a second of time the negative was deeply stained and irretrievably ruined. It is not difficult to see from this that the question of stain is rather one of degree than of presence or absence under the circumstances I have been discussing.

I am inclined to think that the stain may be mainly put down to the action of the reducing agent on the bromide of silver in the film, which does not need any free silver for it to be rendered impressionable by light. This view is to some extent confirmed by the appearance of the negative during the intensification and the peculiar effect of developing, a purely bromide plate being reproduced to a considerable extent.

Mr. Byrne's views about iron development are foreign to the exact bounds of my subject; but as they lead up to my present remarks I may say a word or two about them. He considers the function of the iron developer is simply to remain on the plate till its total possible effect is produced, and then to wash it off. Nothing could be more incorrect. The whole secret of successful development

consists in so watching the action of the iron that it can be washed away exactly at the proper moment; and all the difference in the world can be made in a negative by altering the time the iron is allowed to act upon it. G. WATMOUGH WEBSTER, F.C.S.

TRANSPARENT SPOTS IN THE NEGATIVE.

THERE is no photographer whose attention has not frequently been occupied with this subject, and who has not occasionally been placed, for the moment at least, in a position of great perplexity by it. The collodion film, especially after fixing, often shows fine holes of various sizes, which print as black spots in the positive. This unpleasant *contretemps* often appears so suddenly that one plate will be perfectly clear and the next riddled with pinholes. It may, therefore, be of some interest to go over and collect together the various methods which have at different times been recommended by different professional men for the prevention of their occurrence.

The cause of the perforation of the collodion film is almost always the supersaturation of the silver bath with iodide of silver. Iodide of silver, to a certain extent, dissolves in the solution of persulphate of silver, but it is precipitated as soon as the latter is saturated. This sometimes happens, also, in consequence of a decrease of temperature, which exercises a great influence upon the solubility of the salt. The precipitated iodide of silver, being in the form of such fine powder that it cannot be removed even by repeated filtering, will, when a new collodion film is being sensitised, in consequence of the constantly-increasing formation of iodide of silver, be suddenly precipitated on the glass plate as fine particles, which, at the exposure, protect the underlying iodide of silver film from the light. At the developing the iodide of silver particles affected by the light are rinsed off, and the underlying iodide of silver film, being unaffected by the light, is dissolved in the soda bath. These places thus become transparent, and give black spots in the positive print.

The oldest and, at the same time, surest, but too troublesome, way of renovating a defective silver bath is to evaporate the bath to dryness, to make it red hot, and to redissolve the residue in twenty times its weight of water. When the solution has been well shaken, and filtered until clear, evaporate again until the fluid is reduced by one-half, or add an equal weight of fresh persulphate of silver. This method is, however, seldom used now, because it is rather troublesome, and occupies too much time.

Instead of this method, the addition of various substances which cause a precipitate in the silver bath has been recommended—a precipitate which, combining with the iodide of silver, carries the latter with it, and is removable by filtration. Amongst these substances are citrates, carbonates, &c., and even hydrochloric acid. These substances make insoluble compounds with silver, along with which a part of the merely difficult-of-solution iodide of silver is thrown down. The addition of acids forming insoluble silver compounds has, however, the disadvantage of setting free nitric acid in the silver bath, which renders the collodion film insensitive, and must, therefore, be removed. Hydrochloric acid is not recommended, because chloride of silver dissolves in solutions of nitrate of silver, and then fogging is the probable result.

Kaolin, sulphate of baryta, animal charcoal, &c., have also been prescribed. The silver bath is well shaken up with one of these substances and filtered, and is then, if the added substance were pure, freed from excess of iodide of silver. Artificially-prepared, chemically-pure sulphate of baryta, being perfectly insoluble in anything, is, of the three substances mentioned, that worthy of the highest recommendation. The fact upon which all these methods are based is that iodide of silver forms but a weak compound with nitrate of silver, which at a certain degree of dilution can no longer exist, and which on being shaken up with a finely-powdered substance is quickly decomposed and precipitated, and can then be filtered off. We met, on another occasion, with a property similar to that of the silver compound. The silver is precipitated with difficulty from a very diluted silver solution by means of hydrochloric acid, because the chloride of silver remains for weeks suspended in the solution. If a milky solution, on the contrary, be well shaken up the chloride of silver is quickly thrown down to the bottom, and the fluid above becomes quite clear.

The formation of bicarbonate of silver in the bath has been found a very serviceable method. The addition of carbonate of soda to the silver bath results in the formation of bicarbonate of silver and nitrate of soda—the first of which, being insoluble, is precipitated, and when strongly shaken carries down iodide of silver with it, and thus clears the bath. By this means the bath is de-acidified, and before being used a few drops of nitric acid must be added.

The addition of freshly-precipitated and well-washed carbonate of silver, however, recommends itself as the most rational method. Carbonate of soda solution is added to a freshly-prepared silver solution until there is no more precipitate; it is then well shaken, and left to settle, after which the bicarbonate of silver thrown down is purified by repeated washings. The deposit, while yet damp, is then added to the silver bath, thoroughly shaken, and left to settle. The precipitate is left in the bottle, into which the silver bath is poured back as required. It should be unnecessary to add that if a silver bath purified in this way give foggy negatives a few drops of nitric acid must be added to it.

But, in summer especially, when the temperature is high it often happens that the iodide of silver accumulated in the bath is soon thrown down in the form of crystals, and the plates are full of holes, in spite of the bath containing the normal silver contents. Here it is evident that by the rapid evaporation of the water the iodide of silver is crystallised, while the easily-dissolved nitrate of silver is still able to remain in solution.

Besides iodide of silver persulphate of silver may give rise to this trouble. Some years ago Dr. Vogel showed that the difficulty of solution of persulphate of silver might be the cause of transparent pinholes in the negative, and that the nitrate of baryta might be employed for its reduction and removal. By the addition of nitrate of baryta sulphate of baryta is formed, which, being perfectly insoluble, is precipitated and can then be filtered off.

—*Photographische Monatsblätter.* DR. C. SCHLEUSSNER.

FURTHER EXPERIENCES WITH GELATINE EMULSIONS.

[A communication to the Liverpool Amateur Photographic Association.]

DURING the last few months I have been making attempts to attain the great desideratum of those who work with the gelatino-bromide process—an emulsion upon which absolute reliance may be placed at all seasons of the year.

I have long ago arrived at the conclusion that the ordinary gelatine film, wtthout the presence in it of an organifier of some kind, is utterly untrustworthy. Experience has abundantly proved this to be the case. The same batch of plates which today will yield negatives of the greatest excellence will, a short time hence (from some cause which we will not now investigate), manifest, perhaps, an aggravating tendency to blister; or else an inexplicable invasion of red fog; or, possibly, an image of extreme thinness, which will obstinately decline to be intensified by any agent employed for the purpose. Now, I find that all these ills, and many more besides, are entirely remedied by the presence of an organifier in the film.

There are probably many substances which will supply us with what we want. Till quite recently, however, mild ale has been ascertained to be the best organifier for gelatine. In the proportions of half beer to half water nothing can exceed the excellence of results obtained with commercial pellicle. But the difficulty with me has always been to persuade an emulsion of my own making to imbibe the beer without a result of disorganisation and discolouration. I have tried to organify emulsions of many kinds as regards the proportions of ingredients with uniform non-success, save in the cases I am about to detail.

I must premise that I find that those emulsions which have an excess of silver are the most workable and give the best results. Accordingly my formula is this:—

Gelatine	20 grains.
Silver	20 „
Bromide	10 „
Water	1 ounce.

My experiments have been confined to the three bromides—ammonium, cadmium, potassium—and of these the first only will readily admit an organifier.

With bromide of cadmium I have failed entirely. With potassium I was more successful; but the trouble involved was considerable. Six ounces of emulsion were made in the usual way with distilled water; and, after cooling, and washing for six hours to get rid of the free silver, the gelatine was placed in a vessel and allowed to simmer at a gentle heat for many hours, until three ounces only remained. To this residuum three ounces of mild beer were added, and the result was an emulsion which gave a fine creamy film, and negatives of excellent density and character. Negatives 1 and 2 are specimens of this batch, and when I tell you that No. 1 was exposed several months ago in misty sunlight for thirty seconds, and No. 2 in the exceedingly bad light of this morning for two minutes and a-half, you will appreciate the capabilities of these plates.

The substitution of bromide of ammonium for potassium removes all difficulty from the employment of beer as an organifier. Twenty

grains of gelatine are melted in the usual way in three drachms of water in which ten grains of bromide of ammonium have been dissolved. Twenty grains of silver are added in one drachm of water; the emulsion is poured out to set; and then, after some hours' washing in a fine hair-sieve, on being melted four drachms of warm beer are added. Negative No. 3 was taken on a plate prepared with an emulsion of this kind. The exposure was forty seconds in misty sunshine, with Ross's 5 × 4 doublet, stop 4. Any amount of density can be got with beer plates with alkaline developer alone.

Beer emulsion, however, will not give an absolutely trustworthy film. In damp weather plates prepared with it are apt to be attacked by small fungoid spots, which spread over the plates, and ruin them utterly.

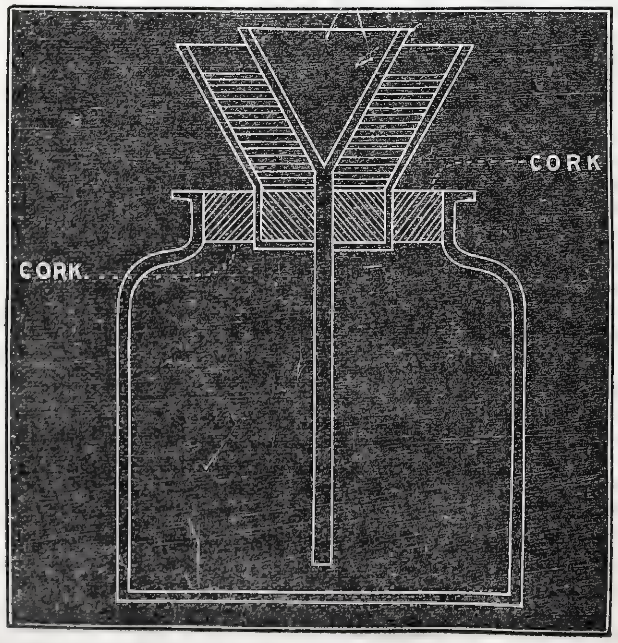
Mr. Kennett has informed me that in the case of his pellicle all the advantages of the beer process may be gained, without risk of these fungoid nuisances, by simply steeping the pellicle in ale for an hour or two, then pouring the beer away, and mixing the emulsion with water in the usual manner. My experience, however, does not bear this out. Two plates exposed together under the same conditions of light—the one being an ordinary water plate, the other prepared as Mr. Kennett suggests—gave precisely similar results, and require re-intensification with silver to bring them up to printing density.

The question, then, naturally arises—Can an organifier be found which will combine the advantages of the beer-plate with freedom from the fungus difficulty? And I think the plate (No. 4) which I now hand round satisfactorily answers the question. Acting on the supposition that fermentation is the source of the evil in beer plates, I tried first a decoction of hops. With this I failed miserably after repeated attempts. I then had recourse to coffee, and the result was most satisfactory. Negative No. 4 was prepared exactly in accordance with the formula and details I have already given, with the single exception that coffee was substituted for beer. The films of these plates are less dense than is the case with ordinary gelatine prepared with bromide of ammonium, and are a shade slower than beer plates; but they give negatives of great softness and beauty. No. 4 was taken in hazy sunshine, with Dallmeyer's small rectilinear, stop 4, in thirty seconds.

Coffee plates admit of considerable latitude of exposure, as plates 5 and 6 will testify. Both were taken in the same light, and with the same lens and stop, yet plate 5 had an exposure of thirty seconds and plate 6 of one minute. I am glad to find that equally good results are obtained from the gelatino-coffee process when it is applied to portraiture.

No one would suppose that the picture I now pass round (No. 7) was taken on a dry film. It has all the brilliancy of a wet plate, and has amply sufficient density for printing. The plate was exposed on Tuesday last—an exceptionally dull day—and the time was forty seconds, with Ross's 5 × 4 doublet, stop 1. I should add that the coffee I have used was taken from the coffee-pot at breakfast, diluted slightly with water, and then carefully filtered.

The accompanying diagram represents a filter I have devised for gelatine emulsions. These are extremely sluggish in passing through



filtering-paper, and the double funnel allows the gelatine in the filter to be surrounded with hot water.

The following facts may corroborate, to some extent, my praise of the organifier. In 1875, I took with me to Switzerland eight dozen water-gelatine plates, and on my return I found that I had barely half-a-dozen respectable negatives; all the rest were over-exposed and fogged. This year I exposed abroad the same number of plates, had scarcely a single failure, and on no plate was there a trace of stain or fog.

I have one more experience to relate, which may be of use to others. Some months ago a doctor whom I consulted recommended me to take a new mineral water—Hunyadi Janos. I derived no benefit from it, and gave up taking it. About the same time I was using a batch of pellicle plates which were exceedingly good in every respect but one—they blistered hopelessly during the washing after the use of the hypo. I was in despair as I saw negative after negative destroyed, and in my desperation poured some Hunyadi Janos over the plate I was then endeavouring to save. To my great delight the blistering ceased, and I find that two ounces of the mineral water to a quart of ordinary water will cure the evil.

H. J. Palmer.

NOTES ON PASSING EVENTS.

By a Peripatetic Photographer.

We are asked, in a "note" from the *north*, if all photographers varnish their negatives? I ask, in return, is there in this "wide, wide world" any other photographer than the gentleman mentioned by Dr. Nicol who does *not* varnish his negatives, or who, if he abstain from doing so, indulges in the hope of being able to produce from them a dozen prints without their being damaged? If they manage to do this in "Fair Scotia's darling seat," I have only to observe that printers there are more careful than any in the sunny south, if I may take the liberty of applying such an appellation to a locality where the Sun appeared openly for two hours about a fortnight ago, and since that time seems to have been so much ashamed of the unwonted liberality as to have hid his face almost ever since. But returning to the subject of the varnishing of negatives: if any one *does* happen to object very much to this precautionary measure—and we all know the act of varnishing is a great nuisance—it is well to know that a solution of albumen applied to the surface, after washing, gives a degree of hardness and firmness to the collodion sufficient to enable a few prints, with care, to be obtained from a negative so treated without much danger of scratching. By adopting the expedient of raising the print from the negative for examination by means of a slight puff of wind from the mouth, instead of doing so by the aid of the fingers, an unvarnished negative may yield several prints; but it is a course that is attended with great risk.

How many colours are there? Or, to bring the matter to a finer point—How many kinds of coloured paper suitable for binding magic lantern slides are procurable? At the close of his interesting—I may even say valuable—series of articles on the preparation of magic-lantern slides, Mr. Thomas Ross suggests the advisability of mounting each set of subjects on paper of a different colour; for example, *The Prodigal Son* in green, *The Pilgrim's Progress* in blue, *Scripture Views* white, and *Scotch Views* red. This is to effect an easy separation should the various entities happen to get muddled. But what about *Irish, Spanish, English, French, American, African*, and *Indian* views? What about sets of photographs of castles or of cathedrals, of the latter of which I know a man who is the happy possessor of forty-six? What about a set of zoological garden occupants, of illustrations for a lecture on the serpents of Asia, of enlarged views of the *diatomaceæ*, of engravings from the *Art Journal*, for the hundred-and-one different subjects suggested by the term "*Biblical Views*," or for sets of portraits of men eminent in surgery, medicine, geology, photography, or any other branch of science? *It won't do.* Let classification of colours be altogether discarded, and adopt, instead, *numbers* pasted on the upper left-hand corner of each picture. These numbers must correspond with an entry made in the lecturer's index-book, which, in turn, must be represented by a concise description of the subject written in his lecture-book. A carefully-arranged set of grooved plate-boxes completes this scheme, which will be found from experience the best and most practicable.

I embrace this opportunity of tendering my thanks to M. Leon Vidal for having so quickly and courteously taken the broad hint I gave in my last "Notes" respecting the desirableness of sending over to this country a few of his specimens for examination. Having called at the publishing office of this Journal I have seen the specimens in question, and most wonderful they certainly are. You say truly

that they are "exceedingly fine and brilliant;" the two portraits, the group of dogs, and the vase of flowers cannot fail to command the highest admiration. It was gratifying to hear that numerous photographers were calling to examine these specimens.

Was it not the *Daily Telegraph* that, a few years ago, spoke so gushingly of the wonderful effects of top light, bottom light, and side light produced on the sedate face of the sitter by the peculiar way in which the cap of the lens was removed to effect the exposure? It must have been so, for at that time I subscribed to the paper in question, and I owe to the article alluded to such pains in my sides from cachinnatory indulgence that my physical condition became wellnigh alarming. Well, the same "daily" has discovered that *this* year Mr. Glaisher, Professor Stokes, Dr. Diamond, Mr. Francis Bedford, and others do not display any pictorial manifestations of their peculiar and characteristic skill. Will its photographic critic be surprised if we inquire whether last year, the previous year, and so backwards for at least a decade, he ever saw on the walls of the exhibition any modern "manifestation" from Mr. Glaisher, from Professor Stokes, or from Dr. Diamond? or if he knows how many years have elapsed since Mr. Francis Bedford ceased to contribute to the annual display of the metropolitan society?

Quite deferring to the authority of our Editors—who, when speaking concerning the cementing of large object-glasses for telescopes, observe, in their append to the letter of Mr. J. Robertson Smith, that the reason why large objectives are not cemented is that the flint and crown glass have a different ratio of expansion by change of temperature, in consequence of which the performance of a telescope would be seriously impaired—permit me to state that, while all this may be, nay *is*, true, the special advantage arising from cementing the lenses may be obtained without paying such a price as the impairing of the image for those beneficial results. I have long possessed a telescope with a five-and-a-half-inch object-glass, the contact surfaces of the flint and crown of which are cemented—not, however, with Canadian balsam, but with a much more viscid and pliant substance, namely, castor oil. No matter what may be the difference in the ratio of expansion of the flint and crown, when connected by this oleaginous body, one of them is quite free to expand or contract without dragging the other with it, and thus bending the objective.

(To be continued.)

DRY PLATES.

The subject of dry-plate photography is, as it appears, not yet exhausted, nor have dry plates been abandoned; for as the seasons return the subject is again resuscitated, and the denunciations uttered the preceding year by practical photographers against the whole tribe of dry-plate photographic processes are, if not quite forgotten, at least stripped of much of their bitterness. Many of the dry-plate processes are excellent in their way, and yet the majority of operators fail to detect their merits, from the fact that they fail in the operation. One cause of failure arises from the circumstance that the mode of preparing the plate, as also of development, is so circuitous and different from those employed in the wet process. Another cause of failure must be attributed to the delusion into which operators are beguiled by the process originators themselves, who very frequently assert that *their* process is almost as quick as the ordinary wet process. Such process originators lose much authority by assertions of this kind; and both the amateur and the practical photographer frequently doubt their veracity, and in the hour of failure condemn the dry process and its promulgator in no measured terms of politeness. These terms are maledictions.

From the respectability and truthfulness of the authors in question it becomes a matter of investigation to ascertain the cause of the discrepancy between assertion and fact; for in practice the dry plate is far from being as quick in receiving the actinic impression as the wet plate, notwithstanding all assertions to the contrary. The way in which I can account for this discrepancy is this:—The originator prepares the dry plate in his laboratory according to his own process, places it, as soon as it is *apparently* dry, in the camera and takes a picture right away with a very short exposure—in fact, with an exposure but a trifle; that is, a second or two longer than that which would be required by a wet plate under similar circumstances. This exposure is made short on purpose, for the aim of the experimenter is to make the dry plate as quick as the wet plate. Now, what is the result? A picture, of course, and probably a good picture, certainly a very clean picture, free from fog and almost perfect, only a trifle *under-exposed*. Such will be the result with almost every kind of dry plate, if the exposure be made within an hour or so after its preparation—at least such is my experience in general. But if we allow such an experiment and result to be our guide in the application of similarly-prepared plates tomorrow or next week we shall be most dreadfully deceived, and the unfortunate dry plate will be unjustly condemned. If now an originator of a dry process limits his operations to trials and tests made from the window of his laboratory, and to exposures of plates *recently* prepared, he may in general derive the conclusion that *his peculiar* dry process is almost as quick as the wet process, and in making such an assertion publicly in the journals he does not offend veracity; but in future it would be well for authors, when they describe a new dry process, to state distinctly the age of the plate employed by means of which a faultless result was obtained. From experiments I have made myself on dry plates, rendered perfectly dry by artificial heat and over twenty-four hours' old, the exposure will seldom be less than from twelve to twenty times that required by a wet plate similarly exposed. Furthermore: be it observed that *over-exposure* is no great fault, for it becomes visible in the development, and may easily be controlled. On the contrary, *under-exposure* is a *real fault*, for it is impossible to force out a detail which has not been impressed by the light itself by any amount of development or subsequent strengthening.

Long exposure, therefore, is the rule with a dry plate. But some one now asks me if success is certain with a dry plate. Again: as a result of experience I must assert that, with properly-prepared plates not over twenty-four hours' old, and with a proper amount of exposure, I will guarantee results as successful as with the wet process.

This being the case, then, it remains to make choice of a dry process which is most easy of manipulation, and which deviates least from the ordinary wet process, If these were to be the grounds to guide us in the selection of a dry process we should at once reject all those processes in which pyrogallic acid, carbonate of ammonia, citric acid, bromide of potassium, &c., are employed in the development. Many of these processes are excellent in the hands of an amateur who makes a practice of employing one of them, and one solely; but the ordinary operator seldom succeeds in them, because they diverge so much from his beaten track. The processes to be recommended, therefore, are such as may be developed by the common iron developer, such as the albumen dry plate, the gum-gallic plate, and the coffee plate. The results with all these three plates are about equally certain; for a time I gave preference to the first, but now I prefer the last.

The plates, already thoroughly cleaned by washing, are coated with a thin film of albumen (one part of albumen and ten parts of rain water), and are thus kept in stock. A sufficient quantity of these plates is prepared with sensitised collodion the evening previous to the intended excursion; that is, they are coated with collodion in the usual way, then washed thoroughly at the tap, and again coated with the coffee solution, which is made as follows:—

Water	$7\frac{1}{2}$	ounces.
Ground coffee	6	drachms.
Loaf sugar	3	,,

Boil the water, then add the coffee and the sugar, and cork up until the infusion is cold; after this the solution is filtered and is ready for use.

Cover the plate thoroughly with the coffee; then rear it away in a cupboard to drain. As soon as all excess has drained from the plate the latter is placed horizontally in a semi-globular-shaped copper vessel, and resting only by its four corners against the sides of the vessel. The vessel itself is kept moderately warm over either a spirit lamp or a small charcoal fire. The collodion film is downwards. In a few minutes the collodion film is perfectly dry, and the plate is stowed away in the changing-box. In this way a dozen plates are easily prepared in an hour.

Expose the plate at least twelve times as long as you would a wet plate.

N.B.—In some of our deep glens I have had to expose a wet plate three minutes. In such a case as this I doubt whether an impression could be obtained by a dry plate even with twenty times the exposure, or even by any amount of exposure; for a certain intensity of light seems to be necessary for a dry plate, for less than which no compensation can be made by increasing the length of exposure.

As a second rule, therefore, make no attempt to photograph deep glens or dark nooks with any of the dry plates in use; for if you do you will invariably be disappointed.

A third rule conducing to success is to develope the plate as early after exposure as possible.

Before development place the exposed plate in a dish of rain water until the surface is uniformly wet; then pour over the film the

ordinary iron developer. As soon as the whole film is thoroughly covered with the developer pour the latter back into a small vial and add a drop or two of the bath solution to it; now cover the film again with the developer. The picture will gradually grow more and more intense until it is finally perfect. It is a very easy matter to make the picture too intense. You must guard against this.

The picture is fixed in the usual way, either in hyposulphite of soda or cyanide of potassium.

This process, you observe, is exceedingly simple, and deviates from the ordinary wet process only in the application of the coffee solution and the artificial drying of the plate.

The originator of the process, Colonel Baratti, uses a special developer, which is composed as follows:—

Water	7½ ounces.
Double sulphate of iron and ammonia	1½ drachm.
Loaf sugar	1½ ,,
Sulphate of copper	1½ ,,
Citric acid	3 drachms.

This is an excellent developer, and may be used in the wet process, in which case it can be employed in both processes; but, as before recommended, it is not necessary to change your developer, and this manifestly increases the simplicity of the process.

Whilst writing this article I read the account of a new dry process in the *Photographische Correspondenz*, by Dr. D. van Monckhoven. The plates receive a substratum of gelatine solution prepared as follows:—

Gelatine	1 drachm.
Water	12½ ounces.
Alcohol	1 drachm.

Soak the gelatine in the water for some time; then apply heat and dissolve; finally, add the alcohol and filter two or three times.

This solution is preserved in a well-closed bottle.

When about to use the gelatine, warm the bottle to a temperature of 95° Fah.; then pour sufficient of the solution over each plate, and set it aside to dry.

The sensitive collodion is prepared as follows:—Dissolve one drachm of nitrate of silver in one drachm of distilled water over the lamp, and pour the solution into six ounces and a-half of alcohol; shake the mixture. Now add one drachm of pyroxyline and six ounces and a-half of ether, and shake well until the gun-cotton is dissolved. Finally, add two drops of nitric acid. Set the collodion aside in a dark closet for eight or ten days to settle.

The plates are coated with this collodion, and as soon as the latter has set they are immersed in the following bath:—

Bromide of potassium	1 ounce.
Water	25 ounces.

In five or six minutes the plate is taken out, washed under the tap a few seconds, and then placed in a vessel of common water for about ten minutes.

The next process is to coat the plate with the preservative solution, composed as follows:—

Water	25 drachms.
Tannin	6 ,,
Alcohol	10 ,,

The plate is finally stored away in a dark closet or cupboard to dry.

Dr. Monckhoven's experience in regard to exposure corresponds with my own. He recommends for these plates an exposure twelve times as long as for wet plates under similar circumstances.

The following solutions are required for development:—

No. 1.

Pyrogallic acid	3 grains.
Distilled water	8½ ounces.

No. 2.

Carbonate of ammonia	30 grains.
Distilled water	8½ ounces.

No. 3.

Pyrogallic acid	3 grains
Citric acid	9 ,,
Distilled water	8½ ounces.

No. 4.

Nitrate of silver	1 drachm.
Distilled water	6½ ounces.

The author first goes round the edge of the collodion film with varnish, which is intended to prevent the film from peeling off during development.

The plate is next covered with a mixture of equal parts of alcohol and water, which is drained off from the plate into the vial and used over again.

The film is then washed with common water until it is uniformly moist. It is now ready for development. The plate is then covered with the pyrogallic solution No. 1, which is poured backwards and forwards two or three times upon the film; the excess of the solution is drained into a small vial, and to this are added seven or eight drops of the ammoniacal solution. The mixture is again poured upon the plate; in a minute or so the picture begins to appear. A fresh mixture is now made of fifty parts of No. 1 and one part of No. 2, and the development is continued until all detail is visible. The plate is now washed, and then flowed with a sufficient quantity of No. 3 containing a drop or two of the silver solution. In this way any amount of intensity may be obtained.

The reader will easily observe the want of simplicity in this process; it is in reality the tannin process modified in the manipulation, but not simplified. JOHN TOWLER, M.D.
—*Photographic Mosaics.*

"THE TEST OF ABILITY IS SUCCESS" (?).

IN the course of a casual *réunion* of professional and amateur photographers, and some friends who were neither, the question of success in art, in the sense of public patronage, was discussed, and the above maxim was quoted and its truth firmly insisted on by several of the speakers. As the truth or falsity of the maxim is a question touching the interests of photographers, and is not without influence on photography as an art, I think a portion of our time may be profitably occupied in looking somewhat closely into it.

There can be little doubt that in the purely mechanical arts success may fairly be taken as the test of ability, the general public being quite able to exercise a sound judgment between an article well made and one that is not, and to fully appreciate a piece of apparatus the relative parts of which work smoothly andsatisfactorily together. There is abundant evidence that (not to go beyond our "last") even in photographic appliances, although much larger prices are asked for the best-made articles, that class of work is largely in demand. When, however, we enter the realms of art the case is somewhat different, and the truth or falsity of the maxim will depend altogether on the ability of the general public, who are the purchasers or employers, to justly appreciate what is good and true—to distinguish between what is simply a pretty picture and a fair specimen of true art even although *minus* the prettiness. In other words, the success of a true artist is a test of the ability of his patrons to appreciate true art.

With a view to the practical application of this test I have for some time taken advantage of every opportunity of examining the average work of all classes of photographers. I say the "average work," as it will be readily admitted that every photographer will occasionally produce a first-class picture, and as occasionally pass one that is but poor indeed. From such an examination I am constrained to say that the public taste is not yet quite what it ought to be. That there is evidence of much improvement there can be no doubt. A great deal of the work highly prized ten years ago would not be accepted now, and there is also evidence that the upward movement still progresses, although it is equally evident that much yet remains to be achieved. That the upward movement has not been more rapid is, to a large extent, the fault of photographers themselves or, at least, of a section of them, who, having no higher aim than the gain which their profession brings, are content to pander to such taste as their patrons possess without one thought given to the fact that they have a mission beyond and above mere pounds, shillings, and pence, namely, to strive to raise themselves to a high position in art culture, and then to draw their *clientèle* after them.

Before, then, the maxim which heads this article can be accepted as true, the general public must be trained to better notions of what is true in art, led to appreciate and patronise those who aim at, although they may never reach, perfection. How this is to be done it is not, at present at least, my province to say.

But there is one thing that I am convinced has had much to do with both the retarding and, however paradoxical it may seem, the advancing also of the desired improvement; I mean the now almost universal habit of retouching. It has kept its ground, and we must accept it as a fact that there is hardly a negative now printed until it has been subjected, more or less, to the handiwork of the retoucher. At first this was an almost unmixed evil, every line and vestige of texture being cruelly obliterated. Now the tide seems turning, if it have not already turned, and photographers are discovering that only an artist's hand can be trusted with such delicate work, the result being that, while formerly anyone who could obliterate a shadow with a wash of colour or obscure a line with a pencil was thought able to do the popular

retouching, now the trained eye and delicate touch of an artist is considered essential for such work.

But the art of retouching, in this the only sense in which it is at all admirable, is not a power to be acquired like "French in four lessons." It is the result of much patient study and careful practice—artistic, anatomical, and mechanical. This, I am glad to see, is gradually being discovered by all who wish to keep ahead of the times, the result being that, while those to whom retouching was formerly entrusted are being relegated to work for which they are better fitted, really good retouchers are at a premium. So much is this the case that, at the present moment, I know of two establishments who are willing to pay high salaries, but who have advertised for some weeks without receiving a single suitable application. On the continent, too—the cradle of the retouching art—the supply is not nearly equal to the demand, many photographers finding it necessary to train assistants for themselves. In one establishment with which I am acquainted suitable hands are engaged for three years, the employers asserting that they get only two years' work, as the first is generally required to be spent in training before they can be trusted with actual work.

The outcome of this should be a lesson to our young men and young women also. Many of them are working as operators, spotters, and mounters, at miserable salaries, who, after a time of necessary study and careful practice, might command much better remuneration as retouchers. Much can be done by study, but more with instruction combined, and therefore I think there is a fair field for the establishmeut of a retouching and modelling school, where the art could be properly taught to those who might wish to adopt it as a profession.

I suppose the time has gone by when a cry would be raised against anything but the actual production of the camera, and, in common with the world at large, I am fain to welcome high-class results without a question as to how they may have been obtained. So long as the retoucher can improve the negative image, without in any degree sacrificing the stern, sterling truth, albeit the best side of the truth—which the camera can and ought to be made to tell—so long shall the retoucher find work to do. And just in proportion to the nature of that work and the intellectual culture which it requires will always be the remuneration that it must command. JOHN NICOL, Ph.D.

UNLIMITED RETOUCHING A NECESSITY.

IN last week's issue we published a paper on *Retouching Negatives*, by Mr. W. H. Rulofson, which he had read before the photographic society at San Francisco. Under the heading given above a New York photographer—whose name the editor of the *Philadelphia Photographer* has not attached to the article—has published in the journal just named a few strictures on Mr. Rulofson's opinions and arguments. The paper, in his opinion, is a very remarkable one, and in some respects seems to herald a "new departure" in photography. Heretofore, he continues, so far as I know, all instructions and recommendations on that subject have carefully deprecated excessive retouching, frequently using such phrases as "much too little is better than a little too much," "don't destroy the characteristic lines," "leave somewhat of the natural texture," &c. But in that article, if I understand him rightly, the author goes the "entire porcine quadruped" without limit or reservation, except the limit of our skill and the more or less importunate demands of the public.

Reduced to its lowest terms and expressed in somewhat syllogistic form, his teaching seems to be—making money is necessary to photographic existence. Photographers cannot make money now without elaborate and even excessive retouching, therefore unlimited retouching is justifiable, as no one will deny photographers their right to existence.

That reads all straight, and admitting the premisses, which few will deny, the conclusion is irresistible. Yet somehow the spirit of the article seemed to breathe at first like the old man's celebrated advice to his son: "Make money, my boy—make it honestly if you can—but *make money.*" That interpretation would evince somewhat of moral *abandon* that did not seem creditable from such high authority. I turned back to the eloquent and stirring address of the President to the members of the National Photographic Association, and read it again. That seemed to speak from a most earnest spirit, animated by the noblest motives. I could not at once quite reconcile the seeming discrepancy. I thought the subject over at intervals for several days, and believe I have found the basis of reconciliation. I have formed the conclusion that Mr. Rulofson takes this bold stand for elaborate and unlimited retouching, not because he is more unscrupulous than others, but more courageous and far-seeing.

He foresees the inevitable, and is too wise to resist it. He is a man of the world, practised in business, and knows so well how irresistible are the tides and currents of its fashions that he will neither stem them himself nor advise others to do so, believing that in a contest so unequal even the strongest would be overwhelmed without doing any good. He therefore advises them to look after their own welfare by giving the public what it wants and is willing to pay for, thus "taking at the flood those tides that lead to fortune."

I have been one of those who still retain some lingering respect for the unsophisticated photograph, and therefore have had some hesitating scruples about making work so entirely deferring to the vain wishes of each customer as to be immeasurably ridiculous to everybody else. But Mr. Rulofson's forcible statements of what we all must recognise as undeniable truths go far to remove all prejudice. It *is* true that we deal with individuals, not communities. We are paid to please them one by one, not *en masse*. If unlimited retouching will really please them, let us exhaust all the resources of the art at present known; then invent yet more elaborate methods.

I for one am a full convert to the "new departure," and henceforth renounce all shame, except for not going as fast and far as others. I have already bought new magnifying glasses for my tired eyes, and would have negotiated for "capacity" if I had known anybody having any to spare in the retouching line. But as most of my photographic acquaintances complain of a "plentiful lack" instead of a surplus, I must try to acquire more by spontaneous development.

Of course, all scruples being removed, there will be a perfect carnival of retouching, for with untrained and unskilled hands we shall try to fully meet the vain requirements of Mr. A. and others of his kind, and there will be a flood of pictorial portrait abominations, removed from the best possibilities of photography even farther than the coarse crudeness of its early efforts; as perfumed and painted courtesans of the city, despite their splendid toilets and polished lures, are much farther removed from all that is noble, sweet, and pure in perfect womanhood than are the rudest and most ignorant country hoydens, each wanting their noblest qualities—the photograph *truth*, the woman *virtue*.

But, like a raging fever, the retouching mania must run its course. We photographers are but the humblest servants of the public in the domain of art, and must not dictate, but obey. Then let us give the public a surfeit of falsehood until, cloyed with the sweet poison, it turns itself to demand the plainer, but more wholesome, fare of truth. Or, if the love of lying flattery is so inherent in human nature that no amount can cloy, let us believe the universal law of compensation will turn the seeming evil into lasting good.

As one immediate beneficial result it will do away with the custom of showing unfinished proofs; for if such wholesale work upon the negative becomes the fashion the folly of showing any but a finished picture will become daily more apparent. If finished proofs only are shown it will prevent or largely restrain us from another mistake into which the "fatal facility" of the present method leads us—that of showing the lot, and throwing the onus of choice upon the customer; because, as we can only afford to fully finish the very best, we must needs discriminate for ourselves, and that alone will be a "powerful developer" to the artistic judgment. Then last, but not least, so much extra work will compel higher prices, and also the rule of payment in advance, to cover the finished proof, at least, for reasons too apparent to resist, and thus permanent good will be accomplished.

LANTERN PICTURES.

THE CRYSTAL PALACE.—THE RECEPTION ROOM.—THE CONVERSAZIONÉS.—THE VARIOUS SECTIONS.

ON entering the Botanic Gardens the scene lay before us in all its brightness and brilliancy. The open green spaces and shady walks were illuminated by lamps of various construction, showing different-coloured lights, and here and there over the grounds a lime-light shone out clear and sparkling as a star. Quite independently of rendering the scene radiant the lamps were placed to illustrate the various new patents in ship, railway, and coal-pit lights.

We enter the Palace to listen to the President's address. The interior is well lighted, tastefully decorated, crowded with science and beauty, and a very pleasing sight indeed. Members of the fair sex are in great force, and from the grave attention with which they listen to the President's address they really look the scientific part they play.

As I looked round the room at the thousands of professed scientists I was reminded of the story I have heard of the young "commercial" who, on his first journey, tried to don the experience of years. An old hand on the road, to test his depth, asked him:—"Of course you'll know Ben-Lomond?" "Ben-Lomond," replied the youth, appearing to be lost in thought—"Ben-Lomond; no! what does he travel in?" "Soft goods," said the knowing one, touching his forehead and walking away. I fear that there were more soft goods than science in the palace; for when Dr. Andrews had wandered over the Arctic regions, the passage of Venus, spectrum analysis, and reached the ice machine, the brightening of eyes and the gentle rustle of dresses as the ladies placed their fairy forms in an attitude of absorbing attention showed that here at least was a subject of which they knew something.

But as the President did not go the length of skating rinks the interest died out.

The reception room, next morning, was a scene of bustle and excitement. The hurry-scurry of obtaining programmes of concerts, tickets for *conversazionés*, forms for the business of the day, and tickets for trips and sights open to the visitors, created a considerable scramble—but very jolly for all that. Then came the shaking of hands, and "How do you do's?"—"I haven't seen you since last year!" "Is Brown, Jones, or Robinson here?" "Haven't seen them." "How did you like the Professor's address last night?" "I've got a new thing that I'm going to bring——" "Yes, Professor, I'm in a hurry now—good morning!" and so, like schoolboys at their lessons, the hum and noise floats through the room.

We attend the *conversazionés*. As they say at the theatre—"Crowded houses," "Doing great business." Refreshments predominated. Gastronomy was the great study here. The strangers (as we are called by the natives) were treated like princes.

Then come the sections in alphabetical order:—

I'll go with you around the square, if you have no objections,
And show you social science there, divided into sections.
First, then, we come to Section A; Mathematical its preachings,
To measure all who come your way the object of its teachings,
Their motion and their time, you know, and every varying power,
And calculate the whole to show how much they're worth an hour.
The British working-man is great in this same calculation,
And *striking* proof of his own weight tells now upon the nation.

Come now with me to Section B, and, if you list a minute,
Chemicals and chemistry you'll find discussed within it.
In ages past, we have been told, this science tried its best
To produce an artificial gold, and this without success;
But, failing in their first essay, they on the threshold stood
Of marv'lous laws brought into play, a thousand times as good,
Which tended to enrich the world with facts before untold,
And in the end have proved to be more precious far than gold.
This science in its magnitude 'tis impossible to catch,
From guiding health to cities to the making of a match.

Then come we to the letter C—Geological its lessons;
From stones on land and stones in sea they bring us home impressions.
That rock ahead, that rock ahead, they are for ever seeking,
And when they find it in its bed they rouse it from its sleeping,
To tell us of its changing form for ages upon ages,
And teach us from that retrospect this tale of stony pages.

The letter D—Biology, in all its varied schools.
It treats of monkeys and of frogs, of wise men and of fools.
Listen! spiritualism introduced; oh! won't there be a row?
Why, the little teacup storm infused is boiling over now:
"The sex in vegetable life, or the apparatus of the lungs,
But no abnormal theory strife," is the cry of many tongues;
"Explain things to us that exist, we want not that which seems;
Improve the knowledge that we have, waste not our time in dreams."

Geography, the letter E, lays out the world before it;
It sketches out each country new, in memory we to store it.
It brings to light the unknown land, and sails on yet to know;
It treads o'er burning desert sands, and rides o'er spotless snow;
It moves along through all climes, with fixéd will and stern;
Of the world to the world it gives, and still goes on to learn.

Economic and Mechanical, the letters F and G;
They treat of pauper children, the building of a quay,
Of charity and savings' banks, of trucks and tramway cars,
The working of a railway crank, the strength of iron bars.
The first of these shows to us the best mode at least to pay;
The last invents the moving power to help us on our way.

We've now run through the Sections, with a picture of each one,
So please cast no reflections upon the work that's done.
I verily believe, my friend, of two in every three,
You've learnt quite as much as those at the science A B C.

MARK OUTE.

OPINIONS OF THE LONDON PRESS ON THE PHOTOGRAPHIC EXHIBITION.

The annual exhibition of photographs in connection with the Photographic Society of Great Britain is again this year held in the well-lighted room of the Society of Painters in Water Colours, 5, Pall Mall East. In the present collection, which is arranged with care and judgment, there is nothing particularly striking. For a time the art of sun-painting seems to have come to a standstill. Of course old processes—how soon in these days that which is almost new comes to be spoken of as "old!"—are improved. The photographer of former days worked to a great extent in the dark. Now he proceeds on well-understood principles, and with tolerable certainty as to results. Having attained a degree of perfection in the art that may well surprise the uninitiated he appears for the moment either content to rest where he is, or to have reached such a standpoint as to regard further progress as improbable, if not impossible. The present exhibition, if it shows little advance on those of preceding years, is nevertheless a very interesting one. The leading photographers, amateur and professional, are well represented, although there are some notable absentees. Amongst the former Mr. Robert Crawshay, of Cyfarthfa Castle, contributes numerous examples, chiefly of views in South Wales, than which nothing could be finer. Another distinguished amateur, Colonel H. Stuart Wortley, is represented by several of his well-known studies of sea and sky, in which the light and shadow blend into each other with marvellous fidelity to nature. Mr. J. H. Mann's views in Tangiers and Gibraltar are bold and effective, as also are those of various places in Italy, by the Rev. W. A. Crofton Atkins. In portraiture there are many excellent examples. Those of Mr. A. Boucher, of Brighton, are very charming, especially his Rembrandtesques, which are "touched" with exquisite delicacy and to great advantage. Messrs. R. Faulkner and Co. are represented by a frame of children taken instantaneously, and the poses are perfectly unrestrained and life-like. Messrs. Lombardi and Co., of Brighton, exhibit several high-class specimens of portraiture, cabinet and album; and Messrs. W. and H. Fry, also of Brighton, contribute some good work. Mr. Warwick Brooks, of Manchester, is represented by his unique "Academy portraits." Naturally the Autotype Company, of Rathbone-place, Oxford-street, who have done so much for photography by means of their carbon permanent enlargement process, are well represented. Their examples are always worth careful study, and in the present exhibition they are, as usual, of the highest class. The Woodbury Company, of Great Portland-street, exhibit some careful photographic reproductions of paintings end engravings. Mr. Warnerke sends several fine tissue negatives with prints from them; and on the table will be found lantern transparencies by Mr. F. York; photographic apparatus by Messrs. Oakley and Co.; and a revolving stereoscope containing pictures taken in India, Japan, and Java, by Mr. J. Beasley, Jun. The exhibition will remain open till the 14th November.—*Morning Advertiser.*

Our Editorial Table.

VIEWS IN SOUTHERN EUROPE. By W. B. WOODBURY.

It is known to many of our readers that the state of Mr. Woodbury's health necessitated his spending last winter amid the more genial atmospheric influences of a southern clime. During his tour—for his residence abroad (principally in Italy) assumed that form—he took full advantage of the facilities afforded by collodion emulsion pellicle and a portable camera for securing transcripts of nature from the various interesting places he visited.

The circumstances under which Mr. Woodbury photographed were comfortable in an extreme degree. When photographers travel on the continent with a supply of sensitive dry plates they are usually kept on the tenter-hooks of excitement lest their batch of carefully-prepared plates should fall a victim to the prying eye of the custom-house officer; for it is within the experience of several photographic tourists that many plates have been rendered useless by exposure to light during the search of revenue officers of the various states through which the traveller may have had to pass. But of this source of annoyance and worry Mr. Woodbury had no experience, because he did not carry any sensitive plates when passing the barrier of any country. Taking with him a small packet of the dried emulsion now so easily obtained in the form of a coarse powder, and which may be simply kept in a bottle formed of orange glass, Mr. Woodbury had merely to procure a little ether and alcohol when he found himself within the boundaries of the country in which he intended to operate. By adding to this mixture a certain proportion of the emulsion powder it immediately dissolved, and after a very brief period was ready to be poured upon the surface of the glass plate, which, when dry, was found quite prepared for exposure in the camera either immediately or after a lapse of several weeks. Mr. Woodbury having on one occasion been short of glass he was indebted to a "happy thought" for extrication from his difficulty. Investing a few pence in common gelatine and note-paper he removed the exposed and developed films from the glass plates, and re-transferred these pellicular negatives to glass after his return to this country, this being so successfully accomplished that he did not lose or damage a single negative. The number of negatives taken in this manner during Mr. Woodbury's continental tour amounted altogether to a hundred and forty, of which a hundred and twenty are so good as to be already used for commercial purposes. We have dwelt upon these matters as an incentive to those who desire to combine photography with travel, and with the least possible amount of trouble and *impedimenta.*

Of the pictures which have elicited these remarks we have merely to observe that they are very charming and full of detail, and the subjects most interesting; for Pompeii, Milan, Florence, and Amalfi are replete

with exquisite views for the camera of a man of artistic taste. It has been stated that Milan Cathedral is a subject which has long set at defiance the skill of the photographer, owing to the difficulty of including it all in one picture. In Mr. Woodbury's picture, the lens has not only been able to include the cathedral, but also large architectural masses on either side of that edifice.

VIEWS IN THE FOREST OF FONTAINEBLEAU. By J. H. C. HARRISON, Asnières.

So far as we are aware the printing of small landscapes in carbon is not much practised in this country, pigment printing being as yet confined either to portraits or to landscapes of large dimensions. But that pigment printing may be very effectively applied to landscapes the pictures before us afford important testimony. These consist of woodland scenes taken in the forest of Fontainebleau. The artist is quite a young man, a son of Mr. W. Harrison, of Asnières, near Paris, whose name will be immediately recognised as that of our esteemed French correspondent in 1864—the predecessor of the late Mr. R. J. Fowler.

Of the success that awaits M. Harrison, Jun., we entertain no doubt. Seeking subjects for his camera in the recesses of a vast forest, he has from such circumscribed material managed to secure several diversified phases of forest life—gnarled trunks, pendant boughs, rich foliage, with mossy banks and leafy glades. In the selection of his subjects M. Harrison shows that he possesses excellent artistic taste.

Meetings of Societies.

LIVERPOOL AMATEUR PHOTOGRAPHIC ASSOCIATION.

THE usual monthly meeting of this Association was held on Thursday evening, the 28th ult., at the Free Library,—the President, Mr. W. Atkins, in the chair.

The minutes of the previous meeting were read and confirmed.

The Rev. H. J. Palmer then read a paper on *Further Experiences with Gelatine Emulsions.* [See page 473.] The paper was illustrated by a number of most excellent negatives taken for the purpose, and also by a quantity of negatives taken by Mr. Palmer on the continent during the summer. The whole of these negatives were of such a superior character that the attention of the members was at once attracted, and at the close of the paper several members expressed their desire to work a process which gave such satisfactory results.

A discussion followed on the causes and means of avoiding the blistering of gelatine films. Mr. Palmer could not give the analyses of the "Hunyadi Janos" water which had so good an effect on his plates; but Mr. Wharmby suggested that it might be similar to Epsom salts, which had been also recocommended to avoid blistering. A vote of thanks to Mr. Palmer was passed unanimously.

Mr. W. Horsman Kirkby showed some prints taken on wet emulsion plates coated with albumen, which he preferred to wet collodion, being equally rapid and not so liable to quick drying, in case of their not being brought into use for an hour or two. Mr. Kirkby also showed some good examples of double printing by painting over the portrait previous to printing-in the background, and afterwards washing off the colour before toning.

A number of prints were exhibited, being the work of Messrs. Forrest, King, &c., &c., and several pictures were presented for the Society's album by Messrs. Kirkby and Forrest.

Mr. J. H. T. Ellerbeck and the Secretary presented a number of lantern transparencies for the use of the members.

An improved form of sciopticon lantern was exhibited, but the trial between it and the old form of sciopticon was postponed until a future meeting.

The presentation prints were then distributed, and the meeting shortly afterwards was adjourned.

Correspondence.

THE PHOTOGRAPHIC EXHIBITION.

To the EDITORS.

GENTLEMEN,—A letter appeared in the last issue of a contemporary, signed "A Country Photographer," which might perhaps be properly relegated to the department ordinarily occupied by complaining letters of disappointed partisans, were it not that some of its statements seem to require just a word of comment such as may be most fitly given in the wider and more influential circulation of your Journal than that in which the letter appears.

The writer hits all round at the exhibitors and the Council of the Society. "Never," says he, "was the exhibition smaller in quantity or poorer in quality; never was our annual show less attractive in effect or more destitute of novelty."

He gives a list of eminent photographers who are absent, and indicates in no doubtful tones what the reason is. It may at once be conceded that the opening was far too early; but the Council having the room on annual tenure, instead of simply having it for the term of the exhibition, concluded to have it open much longer than usual in order to take advantage of the much better daylight for inspection during September than a later month. The spring was a very late and cold one, and not till the middle of June was much activity found amongst photographers. The Council have reason to know that the period has been insufficient for many to prepare exhibits.

A certain number of the list of "total abstainers" given in the letter referred to are of the party who were in power before the present Council came in, and as they have ever since, with little exception, absented themselves from meetings and exhibitions, no one expected them to show up this year either at the *conversazione* or on the walls. If they persist in this course oblivion is surely in store for them. Already their influence is of the past; and silent note is made of one special name "alive and in the full exercise of his art," whose works and fame were once paramount, gradually descending, at exhibitions where favouritism is unknown, from gold medals to silver, thence to bronze, and now simply mentioned in the ruck of exhibitors. I utterly deny the imputation on the hanging committee. It has been a subject for congratulation that the pictures never had a more pleasing look, and never were more fairly distributed.

I ask your readers to go and look at the pictures of "the show" referred to, and see whose are the *well-known figures* therein displayed, and they will then see at once who "A Country Photographer" is, and will understand his grievance. How much better for all parties is the new system of hanging! Of yore the best-lighted portion of the room was selected, and on this were hung the pictures of photographers who had the luck to be of a certain party, the rest being left out in the cold and literally put anywhere. General satisfaction has been given by the present system, which keeps up all round the room a sustained interest for the spectator.

"A Country Photographer," whose memory is so good, no doubt remembers the years of the Crawshay competition, when the kindly intentions of an amiable man were frustrated by a certain set, who were either perfectly incompetent to judge of the merits of pictures, or else reckless of public opinion, as the decisions were so monstrous as to rouse an indignation rarely seen. Exclusion from power was instant on removing from them the means of self-election. I would suggest, gentlemen, to this writer—who veils his personality under a pseudonym—whether, instead of writing angry letters, it were not better for him and his friends to loyally support the Society, even though they who now regulate its affairs are not of their party.

In the wider field of politics the outvoted party does not have empty benches to confront the government, but even though in a minority cheerfully and willingly undertakes its share in the work of the nation, endeavouring by example and precept to hasten the day when the principles they prefer may again prevail.

Let me, in conclusion, just give a hint—not as a "Parthian shaft," but as a friendly suggestion. If certain names are absent much longer from photographic catalogues they will be spoken of as "extinct volcanoes."—I am, yours, &c., A MEMBER OF COUNCIL.

October 4, 1876.

THE PORTRAIT CAMERA IN THE EXHIBITION.

To the EDITORS.

GENTLEMEN,—The camera described in your last number was not exhibited by me, but by the Autotype Company, for whom I made it according to instructions received from them. Thanking you by anticipation for inserting this letter.—I am, yours, &c.

21, *Southampton-row, September* 30, 1876. P. MEAGHER.

PERMANENCE OF SILVER PRINTS.

To the EDITORS.

GENTLEMEN,—I wish to inquire what tests may be considered sufficient to give a character for permanency to a photographic process; in other words, what are the best means to estimate the action of time, and make comparisons with silver prints that, from whatever cause, fade and change? Can any set of chemicals and their strengths be referred to that may cause changes, and yet another process may resist them?

If any experiments have been made so as constantly to *hasten* effects, and afford a fair comparison with the known action of time, a knowledge of them would be esteemed by—Yours, &c., PEARL.

London, October 4, 1876.

[If our correspondent will moisten a silver print and expose it to the action of sulphuretted hydrogen, or even to the vapours arising from the combustion of common gas, he will in this way ascertain in a few hours or days what the effect of time would be upon the same prints.—EDS.]

EXCHANGE COLUMN.

Meagher's whole-plate dark tent, with tank, tripod, &c., complete; strong ash tripod camera-stand, with eight-inch brass triangle, and whole-plate water-tight bath, in mahogany case, offered in exchange for Dallmeyer's 12 × 10 rapid rectilinear or other first-class landscape lens.—Address, Wm. Kirk, Walthamstow.

ANSWERS TO CORRESPONDENTS.

☞ *Correspondents should never write on both sides of the paper.*

Notice.—Each correspondent is required to enclose his name and address although not necessarily for publication. Communications may, when thought desirable, appear under a *nom de plume* as hitherto, or, by preference under three letters of the alphabet. Such signatures as "Constant Reader," "Subscriber," &c., should be avoided. Correspondents not conforming to this rule will therefore understand the reason for the omission of their communications.

J. Chaffin.—Received. Thanks.

Ignoramus.—We do not reply to anonymous correspondents.

S. Parry.—Truly amusing; we shall return the enclosure next week.

Rev. F. Hardwich.—We are having the measurement accurately made. Shall send private reply.

L. S.—One part of white hard spirit varnish diluted with two parts of methylated alcohol will give you what is sought.

Old Photo. (Leeds).—The collodion was prepared from pyroxyline organified by the method proposed by Mr. J. W. Gough.

Allen Garside.—We prefer the studio with the ridge roof—the one of which you have sent a pen-and-ink drawing. If you wish the drawing returned send addressed envelope.

J. Y. (Manchester).—The process to which you allude was published in our number for August 6, 1875. There is only one person of that name who has been writing on emulsion photography.

F. R. S.—Dissolve aurine in collodion until a film of a sufficient depth of colour is produced; then add to this a small quantity of an alcoholic sandarac varnish, the exact proportion to be determined by experiment.

T. C. Lever.—We are not aware of the method by which is prepared the varnish employed in chromo. transfers such as is used by Barnard and Sons. Perhaps some correspondent will give the required information.

B. B. C.—The crack in the lens will scarcely affect its working; but the unsightly appearance caused by it may be lessened by applying to the outer end of the crack a very weak solution of Canadian balsam in benzole.

Geo. Elder.—The proposed studio will answer very well, with one exception, viz., that the west side-light should be extended about three feet, and must be glazed with ground, not polished, glass. The roof, on the contrary, ought to be fitted with plain glass.

J. M. E.—There is no restriction connected with Mr. Kennett's camera-stand. You will find a detailed account of it, with illustrations, in our number for January 14th of the present year. It certainly does all that has been claimed for it, and we can advise you to have one made.

X. Y. Z.—The prints were not enclosed. If the long exposures required do not arise from the chemicals employed you must seek for the cause either in the lens or in the glass with which the studio is lighted; at any rate, there will not be much difficulty experienced in ascertaining the definite cause of the slowness, and this once ascertained the remedy will be easy.

J. W. N.—Instead of converting your closet into a drying-chamber for the preparation of gelatine plates, we advise you to construct a drying-*box*, through which a current of air may very easily be made to pass by the aid of a paraffine lamp. But whichever mode you adopt, let the arrangements be such as to prevent any of the products of combustion from getting into contact with the plates.

Prof. Photo.—You have no right to dispose of a single copy of the portrait of the gentleman named without his sanction. You say that you have registered the portrait. In the first place, you had no right to do so; and, secondly, such registration is of no use whatever, as you have no legal copyright in such a work, nor, as we have often stated, does the mere act of registration confer copyright.

C. W. (Bampton).—Ascertain the specific gravity of the alcohol, and if it be found to be sufficiently strong mix it with the ether in the proportion of two parts of the alcohol to three parts of the ether. By using this as a solvent you will readily be able to dissolve the pyroxyline and thus determine its nature. If the alcohol be too weak you must strengthen it by distillation, or by the other means we have previously described.

Rev. T. West.—An excellent opportunity of seeing not merely the pellicular negatives of Mr. Warnerke, but also transparencies and prints produced from them, is now afforded at the exhibition of the Photographic Society in Pall Mall, there being a large stand fitted up expressly to afford visitors every opportunity of making such examination. By all means go and see this collection. The above also answers your queries respecting pellicular panoramas.

G. Robinson Biggs.—The chief faults in the print enclosed are a want of brilliancy and a general roughness of the surface. If we assume the negative to be all that is desired we must conclude that the silver bath and paper are not adapted to each other. What we recommend is to test the strength of the silver bath, and see that it be kept up to a proper degree of strength; and not only so, but care must be taken to make it slightly acid. From the print sent we would imagine that the paper had been excited on a neutral or alkaline bath. Let this be avoided. Bad paper, or even good paper that has not been kept dry, will produce a similar result.

M. O'C.—French polish is not merely an article of commerce, but is sold by every dealer in varnishes throughout the kingdom. Should you have difficulty in obtaining it ready prepared, it can be made by dissolving twelve ounces of shellac in a quart of wood naphtha, and adding to this half-a-pint of linseed oil. Other quantities, greater or less, may be made so long as these proportions are adhered to. The work to be polished is rubbed lightly by a pad composed of thick woollen cloth, to the surface of which some of the polish has been applied.

Received.—Ellerslie Wallace. Thanks.

South London Photographic Society.—The first meeting of this Society for the next session will take place on Thursday next, the 12th inst., at the rooms of the Society of Arts, Adelphi, when a paper will be read by Mr. S. Fry; also another by Mr. Warnerke, on *A New Application of His Sensitive Tissue.*

Bengal Photographic Society.—With much regret we learn, from a letter we have received from Captain Waterhouse, that the Bengal Photographic Society is not in the healthy condition its well-wishers desire. It has been decided that there will be no exhibition this year. An intention has for some time existed that the society should be broken up. Before carrying out these resolutions it was determined to make another appeal to the members, but without any satisfactory result; hence the definite decision regarding the exhibition. With regard to the future of the society, should there appear any real desire on the part of the public and photographers in India that it should continue to be carried on, an effort will be made to revive the society; but if such effort prove futile it will be finally dissolved in March next. We sincerely trust the committee will not be driven to the adoption of this extreme step, but from the remarks of Captain Waterhouse we scarcely anticipate anything else.

Solubility of Dried Collodion Pellicle.—We have directed special attention to the best manner in which to dissolve dried collodion pellicle that is slow to succumb to the solvent powers of ether and alcohol after it has once been desiccated. In writing on this subject we have, perhaps, attributed to this dessicated pellicle a greater degree of insolubility than it really deserved. Be this as it may, we record with much pleasure the exceeding facility with which we have dissolved a packet of pulverised dry emulsion (we are quite well aware of the "contradiction in terms" employed by us) received from Mr. Mawdsley, of the Liverpool Dry-Plate Company. The "pellicle" was pulverised, and in the form of coarse oatmeal; and when added to a solvent mixture composed of equal parts of strong ether and alcohol, it dissolved almost instantly. We coated with this emulsion a plate in five minutes after it had been formed, the negative we obtained from this plate being of a most excellent quality. In connection with this subject we invite attention to our remarks in noticing some af Mr. Woodbury's pictures in "Our Editorial Table" in the present number.

LONDON GAZETTE, *Friday, September* 29, 1876.

Partnership Dissolved.

Webster and Son, Chester, photographic artists.

METEOROLOGICAL REPORT,

For two Weeks ending October 4, 1876.

Observations taken at 406, Strand, by J. H. Steward, Optician.

These Observations are Taken at 8 a.m.

Sept.	Bar.	Wind.	Wet Bulb.	Dry Bulb.	Max. Tem.	Min. Tem.	Remarks
21	30·29	SE	52	53	73	48	Foggy
22	30·09	SE	55	59	74	51	Foggy
23	29·87	SE	59	61	70	57	Dull
25	29·82	W	56	61	66	57	Cloudy
26	29·75	S	57	60	67	55	Dull
27	29·77	NE	55	57	—	55	Dull
28	29·47	SW	59	62	66	55	Cloudy
29	29·65	W	53	56	65	50	Cloudy
30	29·61	SE	53	55	59	50	Raining
Oct.							
2	30·21	S	48	52	57	46	Cloudy
3	29·92	SE	53	55	66	50	Cloudy
4	29·79	W	62	64	—	53	Cloudy

CONTENTS.

THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 858. Vol. XXIII.—OCTOBER 13, 1876.

MR. JOHNSTON'S NEW EMULSION PROCESS.

Since describing, last week, the peculiarities of the material employed in this process, we have been enabled to continue our experiments—not only with the emulsion as prepared by Mr. Johnston, but also by substituting the new salt for silver nitrate in other formulæ. Unfortunately, owing to the limited quantity of the salt we had to work upon, we have been unable to attempt much in the way of analysis, having confined ourselves entirely to an examination of its practical results. We have, indeed, not even accurately arrived at its combining equivalents. The result of a single experiment gave it as a little over 200—perhaps 202; so that its combining value, as compared with the nitrate, would be about one-fifth less. We found, however, that, calculating upon this basis, the soluble bromide was invariably in excess, and in order to properly adjust the proportions of the bromide and silver salt we had to add an alcoholic solution of silver gradually, testing between each addition.

The first emulsion we shall speak of is the one made nearly a fortnight ago, according to the directions and with the materials supplied to us by Mr. Johnston. As our readers may remember, the collodion sent to us by that gentleman contains twenty-five grains of pyroxyline to each ounce of solvents, which latter consist of one part of alcohol and eight of ether. It would be obviously impossible to sensitise or to do anything with so viscid a mixture as the above; indeed, it was with the greatest difficulty we succeeded in getting sufficient of it out of the narrow-necked bottle containing it to perform the first experiment. As we remarked last week, we endeavoured to follow Mr. Johnston's instructions as far as possible, but as these are in certain respects somewhat meagre, we were left pretty much to our own resources. We endeavoured, therefore, from the data we had to work upon, to form an emulsion containing six grains of pyroxyline, twelve grains of cadmium bromide, and fifteen grains of the new salt to each ounce of the solvents, diluting the thick collodion and adding the other ingredients as directed. Some difficulty arose in forming an emulsion, as, after adding the hot solution of silver, the whole mass, which had been tolerably fluid previously, returned to the state of a stiff jelly, and only by the addition of a small quantity of ether could we obtain a fluid result. After standing a short time it became slightly thinner, but was quite unsuitable for coating purposes, though as regards colour and fineness of deposit everything appeared to be as we could wish.

After twenty-four hours the emulsion was much more fluid and of a rich orange-brown colour by transmitted light, and gave a film the only fault of which was its mottled nature; but, looking at the improvement which had taken place during the previous twenty-four hours, we were sanguine that another day would make it all right. But, alas for hopes! the mixture appeared to retrogress from that moment, getting thinner certainly, but at the same time depositing the sensitive haloid in the state of a coarse, muddy mass, which when shaken up gave a rough, "sandy" film, utterly useless for any photographic purpose. In its present state, after nearly a fortnight has passed since its preparation, the "emulsion," if shaken and allowed to stand for a few minutes, deposits the whole of the silver bromide, leaving an almost clear solution, apparently very thin and limpid; but, if it be poured on to a piece of glass, it leaves a rough, "crapy" film, such as is usually caused by the presence of too large a proportion of water in the collodion, or by decomposition of the collodion through extreme age.

We have little hope that the emulsion in question will *ever* prove workable, so have prepared another sample, omitting the addition of the extra quantity of ether, in the hope that a better result may ensue. Meanwhile it may be worth while to consider to what cause such an effect is to be attributed. Mr. Johnston, in the description of his method, makes no mention of any peculiarity in the preparation of his collodion beyond its extraordinary thickness; though indeed, speaking from personal experience, the pyroxyline must be of special make to enable one ounce of solvents to dissolve so large a quantity, for be it understood that in the sample in our possession the cotton is perfectly dissolved, and not merely rendered "pasty" by the partial action of the solvent. No ordinary cotton, however, would be expected to behave in this manner without some other disturbing cause; hence we are driven to fall back upon the new salt in order to explain the unwonted action.

As we noticed last week, the salt in combining with the haloid in the collodion liberates ammonia, as may be readily detected by the smell. Here, then, we have a most powerful disturbing element ready to hand. What is the probable action of such an addition to the emulsion? This question is readily answered by a reference to an article published at page 337 of the present volume, in which we treated of the action of various substances (alkalies amongst the number) upon the collodion film. It will there be seen that the effect of potash added to the collodion, as recommended by the Rev. F. Hardwich, is, first of all, to "glutinise" it (if we may use the term), after which it generally becomes more and more fluid, until at last it appears to hold no pyroxyline in solution. This change is, of course, accelerated in proportion to the quantity of alkali used, and may be made to run through all its stages in a few hours.

Since the article referred to above was written we have tried the effect of potash upon emulsions already sensitised instead of upon the collodion previous to sensitising. Ammonia and caustic lime are equally effective; but potash, from its solubility in alcohol, is much more convenient, and was chosen by us for that reason. A few drops of a strong solution of caustic potash in alcohol added to an emulsion produced a result remarkably similar to that described in connection with Mr. Johnston's emulsion. When allowed to stand for half an hour the mixture became so thick as to make it impossible to move it in the bottle by the most violent shaking—a state in which it only remained a short time. As it became more fluid it was well shaken, and after an interval of two hours from the time the potash was added was as fluid as at first, and gave a very nice-looking film. It continued to get thinner, gradually losing its power of suspending the silver bromide, which settled to the bottom of the bottle, leaving the upper solution quite clear, but of a pale "tea" colour. This, when poured on to a plate, dried with a dead, white granular film, similar to very old decomposed collodion, and in that state seemed to have run its course.

Now the above is but an exaggerated repetition of the behaviour of Mr. Johnston's emulsion—exaggerated merely by the larger quantity of alkali employed in order to accelerate the ultimate effect.

If, then, the effect be similar, and the ammonia, as it would appear, take no real part in the formation of the sensitive film, why should it not be possible to secure any good effects of the new emulsion by using alkali after the emulsion is sensitised in lieu of employing a new and complicated salt, and one, therefore, comparatively more costly? We have never tried the working of an emulsion treated with ammonia in the manner described, and merely throw this out as a suggestion. One advantage the plan would possess is that the effect might be graduated to any degree by the addition of more or less ammonia; but whatever alkali might be employed it would be a *sine quâ non* that it was used only in the presence of excess of soluble bromide.

Having said so much on the theory of the process, we will describe the remainder of our experiments so far as they have gone. One pecularity strikes us at first sight, namely, that the decomposition of the collodion does not occur, or at least does not proceed at the same rate, with our own as with Mr. Johnston's collodion. This at first led us to assume that the latter contained some active agent of which we were ignorant; but upon reflection it appears to us possible, nay probable, that the difference is entirely owing to the nature of the cotton employed in each case. Mr. Johnston's must, as we have before remarked, be of an extremely soluble character, probably made with weak acids and at a high temperature—circumstances which would render it more susceptible to decomposition than a good sound sample of a less solubility. Be this as it may, we have experienced no difficulty as far as we have gone in forming an emulsion in the usual manner, merely substituting the requisite quantity of the new salt for the silver nitrate.

We proceeded first to try the new salt in the presence of free bromide, employing in other respects the formula and materials in general use. The collodion was made with six grains of pyroxyline and twelve grains of dried bromide of cadmium to each ounce, a portion of the alcohol being reserved for the solution of the silver. This quantity of bromide of cadmium would require for its full decomposition thirteen and a-quarter grains of silver nitrate, calculating its equivalent at 154 ($Cd\,Br + H_2O$), which, practically, we find to be as near the mark as we can arrive at with this somewhat uncertain salt. Working upon the result of the trial quoted above, we calculated that nearly sixteen grains of the new silver salt would be necessary to fully convert the bromide; but, in order to leave a margin of free soluble haloid, we added only fifteen and a-half grains, leaving, as we expected, an excess of somewhat less than half-a-grain of bromide. The silver was dissolved in the usual way in a few drops of water and the quantity of alcohol which had been reserved for the purpose, the whole being added a little at a time, and while still hot, to the collodion.

The emulsion was formed without the slightest difficulty, the behaviour of the double salt differing in no respect from the nitrate. A rich, creamy film of very fine colour was produced in about ten minutes, and the emulsion flowed and set upon the plate without any signs of structure; it was, in fact, to all appearances in perfect condition, and was set aside for twenty-four hours to "ripen." After the lapse of that time it was examined, and, though a considerable proportion of the bromide had subsided, a few seconds' agitation restored it to its original condition. A plate was then coated, and the film when set left scarcely anything to be desired. It was set aside to dry spontaneously while a second plate was coated, washed, organified with coffee, and set up to drain. Plate No. 1 was found to have dried with a dull, dead surface by reflected light; while upon looking through it the film was seen to consist of an extremely fine network of transparent lines similar to, but very much finer than, the ordinary "crapy" appearance caused by excess of water. The organified plate, when dried artificially, was slightly better in this respect, but not sufficiently so to make a workable film.

That the reticulation was not caused by using too much water is certain; for the same solvents, the same cotton, and the same bromide used in the same proportions will stand five or six times the quantity of water when silver nitrate is used without producing anything like a similar result. We can, therefore, only attribute it to the action of the sensitising salt, especially as after twelve hours longer standing the structure became visible previous to drying the film, which had not been the case before, and at the present time the films are as bad when wet as when dry. Such was the result with bromide in excess; and when the conditions were reversed the only additional effect was the discolouration of the mixture from some cause or other.

What may be the source of our failure we are not able to say; but it is very evident that under some circumstances the new salt exerts a very powerful decomposing action upon the collodion. Whether Mr. Johnston is able to control that action by the addition of any substance to the collodion, or by the preparation of a special pyroxyline, we cannot say; but, as far as we are able to see, something is necessary to be done. From the fact of the organified plate offering an improvement upon the simply dried one we think it possible that the addition of a gummy or glutinous substance to the emulsion might stay the evil, and Mr. Johnston's suggestion of albumen appears likely to meet the requirements. Albumen, though not usually soluble in collodion, is, according to Mr. Johnston, acted upon by the emulsion, owing, no doubt, to the presence of ammonia. We have sensitised a new lot of emulsion, which we intend to convert into pellicle before the film becomes disintegrated, in the hope that the deleterious matter may be removed before the injury is done. If such a course prove successful we shall then be able to speak of the properties of the new salt from a photographic point of view.

THE PHOTOGRAPHIC EXHIBITION.

[Fifth Notice.]

Curious to see what is new in optical matters the first thing we looked for on the occasion of our first visit to the Exhibition was a "baby" lens, by Mr. M. P. Tench, which the catalogue informed us was "on the tables." Are there more tables than those in the large and elegant hall in which the Exhibition is held? Believing that we know a lens when we see it, we assert that no such sight as that of a "baby" lens, or any other lens, has yet gladdened our eyes in the Exhibition. We here, of course, make a distinction between that to which we refer and the lenses in graphoscopes, stereoscopes, and scenographs. Now why, we inquire, has the committee allowed apparatus of any kind to find a place in the Exhibition, and also in the two editions of the catalogue, if such apparatus was to be there only for the opening night? All who were present on the evening of the inaugural *conversazione* know that it was impossible to examine at leisure the various exhibits; and yet when in little more than a week after the opening meeting we visit the Exhibition rooms to enjoy a quiet examination we find that certain "birds" have "flown." If lenses possessing special features of excellence are allowed to be exhibited at the opening *soirée,* and have a place accorded to them in the catalogue, we protest against their being removed before the public generally can be presumed even to have been apprised of the fact that such an exhibition really exists. An explanation is both desirable and necessary.

While indulging in what some may erroneously imagine a fault-finding spirit towards the managing committee, let us here make ourselves the mouthpiece of a large number of our *clientèle,* and ask—What meaning does the committee attach to the following words, which we quote from an official advertisement that appeared in The British Journal of Photography of August 25th, and signed "R. J. Friswell, Hon. Secretary?" The words are:—"No name or any information will be allowed to remain on the glass or frame" of any pictures sent for exhibition. In the face of this definite announcement the Council owe it to the members of the Society, to exhibitors, and to the public generally, to state for what reason—whether from cowardice or favouritism—they have improperly overridden their own enactment, and with such questionable taste as to have waived it in favour of a few whose names are (as has been said) "broadly blazoned" on their works as if in defiance or contempt of the rule laid down by the Council? At first when we saw the names of Colonel Stuart Wortley and Mr. W. Bedford permitted to remain

on frames in defiance of the advertised rule we concluded that they, as members of the Council, had been arranging special terms for themselves; and even when we saw that some pictures exhibited by the son of the Assistant Secretary had also been thus admitted in direct contravention of the Council's law, we concluded that the services of the parent were so far recognised as to place his son on an exceptional footing; but when in addition to these we find a most reprehensible degree of laxity or favouritism displayed in the cases of men having large businesses who are not, and have not been, even members of the Society, while *members* of not less merit, but who show more deference to the *dicta* of the Council, are thus put under its ban, it becomes evident that an explanation of such conduct is loudly demanded from the committee of the Council to whom was entrusted the management of the exhibition. We trust that future exhibitions will be managed on more equitable principles.

The various pictures—for they are pictures in the fullest sense of the term—contributed by Mr. George Nesbitt, of Bournemouth, mark that gentleman as an artist of the very highest class. In conception, pose, execution, tone, and lighting the works of Mr. Nesbitt are such as to forcibly arrest the attention of the visitor; for, besides being of large dimensions, their subjects are very far above the ordinary class of photographic work. What, for instance, could be finer than his *Evening Prayer* (153), in which a little child (Rembrandt lighting) is seen at her innocent orisons, unless it were his powerful picture *On Guard* (167), representing a large dog lying wide awake, but in perfect repose, by the cot in which lies a sleeping infant? And sound and real is the sleep of this infant—as far removed from the make-believe, doll-infant model as is wellnigh possible. Some connoisseurs have declared this to be one of the finest pictures ever seen at a photographic exhibition. To this assertion we make no special demur beyond this—that in *Yes or No* Mr. Nesbitt has treated a subject which is a little *passé* in a most able manner, the expression and pose of the young lady who seems called upon to speak the word that is to make another happy or miserable being truly admirable. Let us hope that if the "subject" of her thoughts be worthy, as we trust he is, the response of the lady, who bears an expression of loving kindliness in her face, will not prove to be in the negative. *Morning* (202), by the same artist, is represented by a jolly, good-humoured, chubby little fellow, who, having thoroughly enjoyed his night's repose, has just finished doing what all little boys do (wickedly, say mothers and maiden aunts), namely, kick off the bedclothes, and thus await the ever-welcome greeting of mamma or nurse. This picture is a perfect gem; nor are its merits lessened by the adjoining picture, also by Mr. Nesbitt, entitled *Who is it Like?* (203)—a question which appears sorely to trouble the lady who is stooping over the sleeping infant and scanning every feature in the hope of discovering lineaments peculiar to either parent, or, at least, to some departed relative. We all know how the eye of faith and expectation can see ancestral identity in a baby a few hours' old; and, further, all know the story of the amiable, short-sighted lady who, mistaking the pet monkey for the little "newcome," proclaimed it to be the very image of its imagined paternal parent—"sweet little thing!" But there is no mistaking *this* baby. It is, doubtless, a "sweet creature"—all babies are; but it has a facial characteristic of its own, and the question of the particular side of the house to which it peculiarly belongs should not long remain a matter of doubt.

There are numerous subjects on which photographers very frequently "blaze away," but which will not make good pictures. To this class belong the pictures *On the Skirt of the Wood* (44) and *In the Copse* (70), both by Mr. Edward Fox. Had they been treated stereoscopically they would have made most effective pictures, but as monocular views they are confused. Mr. Fox, however, has been far more fortunate in his pictures *Two Garden Studies* (150); for in these the subjects admit of being presented to the eye as monocular pictures, and in an exceedingly happy manner has Mr. Fox executed his task. More attractive still, however, are his two pictures in the frame numbered 288, *Studies near Lindfield, Sussex,* which represent scenery of the attractive character fittingly described as being flower-clad, rocky, and mossy banks.

Here we leave the Exhibition for the present week.

We understand that, in consequence of a resolution to award medals at the forthcoming exhibition of the Edinburgh Photographic Society, a number of photographers have intimated their intention not to forward pictures for exhibition. We have been requested to direct attention to the notice in the circular issued by the Council—to the effect that pictures may be sent for exhibition only, and *not* for competition, and that such reservation will be distinctly marked in the catalogue.

The *Times* of Wednesday contains a list of the British exhibitors at the Centennial Exhibition to whom awards are to be made for the excellence of their various exhibits. Some idea of the lavishness of our cousins in making these awards may be conceived when we state that the list occupies nearly three columns of *The Times*, and, as we have already said, is confined to exhibitors connected with our own country. From this list we make a few extracts which are likely to prove of interest to our readers. For excellence in photographs:—A. L. Henderson, London; W. Bedford, London; Vernon Heath, London; Colonel Stuart Wortley, London; Julia M. Cameron, Isle of Wight; Robinson and Cherrill, Tunbridge Wells; Frederick York, London; Carl Norman, Tunbridge Wells; London Stereoscopic Company, London; Frederick Hudson, London; and Payne Jennings, Dublin. In addition to these we find that an award has been made to J. H. Dallmeyer, for photographic lenses; to Chance and Co., for optical glass; and to the following manufacturers for microscopes, namely, Negretti and Zambra; R. and J. Beck; Ross and Co.; and Henry Crouch—all of London. These names we give in the order in which they are printed in *The Times*.

India-rubber has long found numerous applications in photography as well as in other arts, and the popularisation of pellicular or tissue negatives will bring it even more into use amongst photographers. Whatever its application, photographically, it is always employed in a state of solution, and a suitable solvent is therefore a desideratum. Those most generally employed are benzole, chloroform, and ether, each of which, though excellent in some respects, possesses disadvantages which weigh against its good qualities. The first named is the one most generally employed, chiefly, no doubt, on account of its comparative cheapness; but, unfortunately, the so-called benzole of commerce is so uncertain a compound that it is next to impossible to secure two samples which behave alike in their action upon india-rubber. Some of the cheaper and commoner descriptions of this solvent, which consist wholly or in part of crude petroleum spirit, are quite incapable of dissolving the india-rubber, merely softening and causing it to swell, or at best producing a viscous, glairy mixture which is of little use for the purposes intended. The best solvent of this kind is sold under the name of "sherwoodole," and is a highly-rectified and purified benzole; it is, however, rather expensive if used in large quantity. Chloroform is open to the same objection; for, although it is an admirable solvent, its high price limits its use to tipping the edges of dry plates. Ether has the additional disadvantage of being too volatile for some purposes, while as a solvent it is inferior to chloroform. If pellicular negatives should come into fashion, as there is little doubt they will, a good and, at the same time, cheap solvent of india-rubber will be necessary, and we think we can recommend a suitable one. It consists of a mixture of methylated ether and petroleum spirit—the common benzoline used for burning in "sponge" lamps. This forms the most rapid and, perhaps, the best solvent we have tried; the mixture is as much superior in power to either of its constituents singly as the ether-alcohol is to plain ether in its action on pyroxyline. We make a very thick solution by dissolving sixty grains of good india-rubber in two ounces of benzoline and one ounce of sulphuric ether. If the india-rubber be cut up fine and the mixture shaken occasionally the solution will be complete in two or three

hours, when it may be diluted to any required strength with benzoline *alone*. The india-rubber should be as light-coloured as possible, and all the outer oxidised portions must be cut away. "Shred" the clean india-rubber with a pair of scissors, and throw it at once into the solvent.

"ON CERTAIN EXPERIENCES IN PRINTING."

I INTEND to take as my text for a short discourse on good prints a very reasonable letter signed "W. H. F.," which appeared a few weeks ago in these columns, the several queries of the writer still remaining unanswered, though they are those of one who evidently has his heart in his work, and who is seeking for knowledge which would be of use to others as well as to himself. It may be said, with truth, that most of the information he requires will be found in the back numbers of this Journal; but the queries are so well put, and are the honest avowal of failures combated but not conquered—and not mere inquisitive questions to avoid trouble—that it will not be useless to risk iteration in the endeavour to show "W. H. F." the road to success, his difficulties being typical ones.

I cannot at all agree with the depreciatory remarks with regard to silver prints on paper which "W. H. F." so freely makes. Silver printing never was so beautiful as it has been for the last year or two, and the work of some of the leading men in the profession will bear comparison with any work of art in monochrome, by any process whatever. Rich and delicate, yet vigorous to a most extraordinary degree, they possess a claim to high admiration; yet, on the other hand, nothing can look worse or more mechanical than the wretched, flat, mealy, colourless prints which are still too often seen. The fault lies not in the process, but in the misuse of it.

"W. H. F." must learn that the brilliant and beautiful pictures to be seen any day, if sought for, are not the results of secret processes or unknown dodges; they are the outcome of careful attention to *every single point* that can promote success, failure in a single point tending to nullify all the care bestowed upon the rest. Above all, to obtain uniform results a uniform method of working must prevail. Let "W. H. F." adopt one formula and stick to it till he can produce perfect results, and then he can experiment with others as much as he likes. He is quite right in objecting to the use of what may be called "secret preparations," though the objection to them is to some extent theoretical, and in practice no real inconvenience need be suffered. Albumenised paper requires care and skill in its manufacture; and, to the amateur at least, it would be a waste of time and a loss of money to attempt the making of albumenised paper, for it can be bought better and cheaper than any he could prepare.

Now, as to the kind of albumenised paper to buy: let him ask any photographer of his acquaintance whose work he likes what paper he uses. I think I may say that any professional photographer would inform him without reserve. Then let him purchase a supply for a month or two, and use no other. To think that all papers are alike in their results is an utter mistake; nothing could be further from the mark. The widest difference prevails amongst various makers' albumenising. At present there is a general feeling for warm tones, and most papers are made to meet the demand. On such paper to attempt to produce the old purplish-black tone, once so much admired, would be perfectly futile with ordinary processes and chemicals; but there are papers yet to be had by which such tones can be easily produced. The distinction between the characters of the two classes of raw paper itself, as one may term it, must not be lost sight of—I mean the Saxe and Rives. I have always used Rives for portrait work, and it is now in greatest demand; but time was when Saxe was the favourite. Many years ago one of the largest makers of albumenised paper in the kingdom told me he had few customers besides myself for Rives. This paper gives a greater purity and solidity to the whites, and enables greater delicacy, with force, to be obtained in the half-tones, the whole effect being less paper-like than with Saxe.

Pass we on now to the "experience" half of the letter. And here let me say at once that the writer answers many of his own queries. If his own words had been pronounced *ex cathedra* half his doubting and uncertainty would have been solved. Occasionally, with some negatives, he can get results as near perfection as he believes attainable with paper; there lies half the secret in a nutshell. No printer in the world with an unsuitable negative can obtain a perfect silver print. To produce a good print a good negative is a *sine quâ non;* and just as at any of the first establishments in the kingdom poor prints are occasionally sent out, so poor negatives are occasionally taken. In taking negatives—which, I am thankful to say, is by no means a mechanical process—circumstances have to be moulded by judgment and processes modified by discretion; hence, at times, when the force of circumstances is against one, a perfect negative is not obtained.

If a negative be too weak the print will always, despite all the dodging in the universe, be poor, flat, and weak. If the negative be too dense there will be force and, possibly, results nearly perfect; but more likely hard, as the density may be owing either to under-exposure or over-intensification. If the latter only be the case the print will be rich-coloured and fairly soft if the exposure be correctly timed; but if over-exposed it will be flat, yet not devoid of richness in colour—very different from the tone of a too-weak negative. The characteristics described in the letter are just those a perfect negative should possess; but, says the writer, "that is just the difficulty." Of course it is! If anyone could produce a good negative by any patent means, or with the certainty of a machine, good work would not be at the premium it now is. The delicate, rather under-developed negative, full of beautiful half-tone, is just the one that would be perfect for paper work with a little more intensification; negatives are not wanted for glass printing, except very occasionally. It is quite true that the class of negative now sought to be obtained is the very reverse in character of that required say ten years ago, and it is only the practised judgment of a skilful operator which can hit the exact quality that will give all that richness with softness which only nowadays can be accepted from high-class men. If the negative produced be too dense we get the old class of picture—rich in colour, but not fully possessed of delicacy and complete gradation; if too weak there is gradation but nothing more—flatness, tameness, and want of tone being the prevailing characteristic, no matter how it may be printed.

As to printing in the sun or the shade, my experience is decidedly in favour of shade-printing, except under special circumstances; indeed, my printers' instructions are always to print in the shade or with the sun's strength tempered by screens, one entire side of my printing gallery being provided with sliding screens to draw out when the sun is upon it. If anyone wish to see what the difference really is between sun-printing and shade-printing, let him double a piece of sensitised paper back upon itself, and expose one-half under a negative in the sun and the other in the shade under the same negative. The difference will be most marked. The sun-printed half will be much browner in tone and flatter than the other shade-printed half, and the difference will remain visible all through the processess of toning and fixing.

Similar discrepancies of colour may be produced by printing through glasses of various colours. Each one modifies the tone of the resulting print. Everyone who has tried to print-in a plain background on a masked-out figure must have noticed with disgust how much colder in tone than the figure the background is, and how persistently it shows when toned and fixed. When a negative has been obtained which is too weak a much better result may be obtained by using washed paper with ammonia-fumed pads, or else ammonia-fumed paper, according to the almost universally-adopted plan in America. Brown tones are best adapted for this method.

One of "W. H. F.'s" experiences, more than once named by him, is that the print when finished is less brilliant than when taken out of the printing-frame. Now, I must say that such ought not to be the case; when all the solutions are in perfect order the print as it comes out of the fixing bath ought to look brighter and better than at any stage of the operations. This is a very common complaint, and its remedy has been pointed out before. Yet I know by my own experience that printers are not sufficiently alive to the importance of its chief cause, which is *acidity of the silver bath.* All albumenised paper to be purchased is more or less acid; hence each piece, as it is floated, communicates its quota of acid to the bath, till at last the acidity of the latter is sufficiently marked to turn litmus-paper quite red. Any bath when in this state is useless for the best work. Paper floated upon it *prints* most brilliantly rich and vigorous to the eye but very brown in colour. We anticipate a splendid batch of prints at the termination of the process; but as soon as they have been a short time in the toning bath a portion of their beauty fades. They lose brilliancy, they decline to tone beyond a certain point, and, finally, possess such a disagreeable, washed-out and no-colour sort of look that one feels inclined to pitch them all behind the fire. The remedy for this state of affairs is to add to the silver bath occasionally a few grains of carbonate of soda (not bicarbonate) in crystals till a permanent white precipitate is produced (it is carbonate of silver). This may be allowed to remain in the bottle into which the bath is daily poured; so long as any deposit remains the plates will always be rendered neutral after being shaken up with it. It can be cleared either by filtra-

tion or decantation. In the former case the same filter must be made to do duty for some days, as it will contain carbonate upon its sides, and so always exert a neutralising influence as long as any carbonate remains.

I think I have now touched upon all the points raised except the strength of the silver bath. This much-vexed question should be solved by the albumenised paper-makers themselves. They usually know the requirements of printing, and, knowing the composition of the albumen, can tell the strength of silver bath best adapted to bring out the merits of their respective manufactures. But a sixty-grain bath is rarely required now; from forty to fifty may be considered the maximum, and many papers tone well with a thirty-grain bath. There is no necessity to lengthen this communication by adding formulæ; they are to be had in number in any of The British Journal Photographic Almanacs, and my formulæ are not different from anybody else's.

I hope what I have written may be of service to "W. H. F." If necessary, I shall be happy to supplement my present observations in any manner likely to be of general interest to the readers of The British Journal of Photography.

G. Watmough Webster, F.C.S.

NOCTES WASHINGTONIA.

The Edinburgh and London Exhibitions.—Wet *versus* Dry.

Fraternisation! The term is inadequate to describe the intense feeling of *cameraderie* existing among photographers when a few of them happen to "forgather" at a distance from home under conditions favourable to the indulgence of social feeling. And to the full did this companionable good-fellowship hold sway in the case of a few brethren connected with the art who, influenced by various motives, met at Glasgow during the recent meeting in that city of the British Association. Never, perhaps, in the history of the Association were so many photographers found assembled under one roof as on this occasion found a temporary home at the Washington Temperance Hotel, in which well-appointed hostelry was overheard the conversation about to be chronicled.

Overcome by the excessive hospitality so liberally dispensed at one of the *soirées* of the Association, we sought in the snug back-parlour of our hotel that repose which one never seeks in vain when enjoying the fragrant "weed." To our gratification we found that a few gentlemen who had arrived at an earlier hour were holding converse earnest and free on topics of interest to a photographic journalist. A theme possessing more local than general interest was being discussed as we entered, and from the shorthand notes we took at the time we are now enabled to give the following snatches of dialogue:—

Mungo: You may decry our exhibition as much as you like, and say, as you have done, that "its nae up to mickle," but I can tell you its up to this much—that not a single individual among your Edinburgh fellows would send anything for exhibition. And perhaps you had too good reason for your prudence. What a sorry figure the works of a lot of rusted-up old fogies would have cut beside ours!

M'Edin: Oh! but I did'na mean to say yours were positively bad, but only that they're nae better than we see every day in even your ain show-cases. By and by we'll show you all what *we* can do in Edinburgh; *our* exhibition will be one worthy of the name.

Mungo: But what's up about your medals? Is it true that the old, respectable, conservative, well-to-do photographers object to the medals solely because they think that they have no chance in a competition with the small nobodies of the profession? But even this speaks something for Edinburgh; for there is a tacit admission that medals will be fairly awarded according to merit, and that the system of giving medals to one's friends only will be eschewed, and to which, I believe, is to be attributed the rapidly-decreasing interest in the London exhibition, which I hear is getting worse and worse. But have any of you heard how that affair stands this year?

Mark Oute: I had a hurried glance at it before coming to Glasgow. There are a few fair pictures in it, but nothing beyond what one can see daily in the windows of dealers, or in the show-cases of most photographers. Then the pictures are hung in such a higgledy-piggledy manner as to set at defiance the examination of the works of any one man. To add to the confusion a scheme has this year been adopted whereby no names of either subjects or artists are allowed to be placed upon the pictures, except in the case of a few "pets" of the managing body of the exhibition. Hence there is the anomaly of certain pictures having the title and the name and address of the photographer ostentatiously displayed on the frame, while in other cases there is nothing but a number, which refers to an entry in the catalogue. Grumbling both loud and deep was indulged in against the committee. The motive, too, is paltry; for, although it may force some visitors to purchase a catalogue who might otherwise have been content with the imprint on each picture, the few shillings thus gained will scarcely compensate for the contempt entertained for the paltriness of the motive. The art of making "fish of one and flesh of another" set of exhibitors seems to be well understood by the exhibition committee. That the exhibition of the Photographic Society is held in secret contumely is evidenced by the fact that, so far as I could perceive, there are none of those who are officially connected with it, with one or two exceptions, who even so much as send a single picture for exhibition.

Tom: May not this arise from their wholesome dislike of seeing their works placed in direct competition with, and perhaps eclipsed by, those of less-known men, or of provincial photographers unknown to fame?

Mark Oute: Such a reason, indeed, was freely hazarded, and I think it the true one.

The Peripatetic: Do, for heaven's sake! change the subject and let us talk upon one on which we are likely to agree. We are all interested in the future of the art by which most of us here present obtain our bread and butter. Bosh without end has been talked about the comparative merits of dry plates and wet plates; and I would submit, for a quiet minute's consideration, whether any of you think the dry process is ever likely to be of practical utility to a professional photographer who has to take *carte* negatives sometimes at the rate of seventy a day.

Little Harry: No! no! not a bit o' it. The dry process may dae weel eneuch for some folks, but its no for the likes o' us.

Mac: Have you ever tried it?

Harry: I'm surprised at you speerin' sic a question. Try it! not I indeed! I hae eneuch to dae to mind my ain business without rinning after new-fangled things.

Mac: You are the type of a small-souled photographer whose connection with the art goes no deeper than the desire to make money out of the public by taking your wretched little shilling pictures!

Harry: Dinna get angry, man! But you are richt; I aspire to produce shilling pictures, and as many o' them as I can. Fine art or high art I ken naething aboot. But, I ken some fine-art photographers wha strut aboot upon stilts—I was na' a fortnight in London for naething I can tell ye!—and wha talk sickly sentimentalism aboot art and feeling, and chiarascuro, and Sir Joshua, and Sir This and ither big artists, and yet wha canna mak salt to their kail by takin' pictures themselves. As for being able to lay past something for a rainy day, or even to pay their rent it is out o' the question; but what o' that sae lang as they are "artists?" No! *I* mak nae profession to be an artist; I'm a plain taker o' likenesses wha likes to turn an honest penny.

Mark Oute: It occurs to me that a good way by which to arrive at a fair idea of the comparative value of the wet and dry process will be for us to make use of both during our trip to the Trossachs tomorrow. We have at least one dry-plate camera and one wet one amongst us, and let us subject this question to the test of experiment, meeting here again tomorrow night to show our pictures.

Omnes: Agreed!

CERAMIC PHOTOGRAPHY.

In a previous article I endeavoured to press on the attention of photographers the advantages likely to be derived from a more general attention to this beautiful branch of photographic art, and also to show that the difficulties and uncertainties so generally supposed to exist in its practice are more fanciful than real. Having recently had an opportunity of seeing the successful production of enamels by one of my friends, and having made a number of experiments myself, I now propose to describe the process as I saw it carried out. Although, in consequence of the limited space at my disposal, the description must be brief, I hope to make it sufficiently clear to enable anyone who will give it a fair trial to succeed after very little practice.

It may be as well, at the outset, to say that although the operation as a whole is extremely simple, some of the steps require very delicate manipulation, and all demand the greatest possible care, as slight impurities, or the presence of foreign matter that would be perfectly harmless in ordinary work, would altogether destroy a picture that had to pass through the fiery ordeal. I should like also to add that the process about to be described may not be that by which the enamels that have already made a few operators famous have been done, neither may it be the best that has been discovered; but I do claim for it this—that in the hands of an intelligent photographer and careful manipulator it is capable of giving ceramic photographs of exquisite beauty and unquestionable permanence.

An ordinary enamel, as is well known, consists, essentially, of a film of more or less easily-fused glass—generally silicates of potash, soda, lead, &c.—the picture or design being formed of certain metallic oxides which, in combination with the silicates, produce the desired colours; and the difference between this and a photographic enamel lies in the fact that the metal of which the picture is produced, instead of being laid on by hand, is by means of photography deposited in the body of a film of collodion.

The whole process of photographic enamelling may be briefly summarised as follows:—First: the production of the transparency, of which the image consists of metallic silver in a collodion film, by any of the well-known methods. Second: the complete removal of the silver by the substitution of one or more metals that, in combination with silicious glaze, will give the desired shade of colour. Third: the transference of the picture-containing film to the tablet or porcelain article, and the covering of it with the glaze. And, fourth: the fusing of the silicates, or *burning-in.*

In the production of ceramic photographs, as in that of photographic pictures generally, the first essential is a good negative. It should be perfectly sharp, full of minute detail, and of sufficient density to yield a brilliant print on paper. From this a transparency is produced, preferably in the camera, by wet collodion; and, as much of the ultimate success of the operation depends on the production of a suitable transparency, great care is required in this step. The collodion should be made with pyroxyline that gives a tough, structureless film, and should not contain more than from one-half to two-thirds of the ordinary quantity of bromo-iodides. Any good commercial sample will do provided the film be tough, and if diluted with from a third to a half of plain collodion. The bath must be in such order as to readily give all gradations from perfect opacity to clean glass, and should be decidedly acid.

With a view to getting the silver, of which the image is formed, in as fine a state of division as possible, the development should be conducted with pyrogallic acid, the formula that has been found to answer best being—

Pyrogallic acid	3 grains.
Citric acid	½ grain.
Distilled water	1 ounce.

Glacial acetic acid, sufficient to make the solution flow freely without alcohol.

The development must be conducted with considerable care, and the exposure timed so as to admit of the production of perfect detail, and, at the same time, the keeping of what are to be the highest lights clean glass. It will be evident that the brilliancy of the enamel will much depend on the amount of contrast in the transparency; but, after a few experiments, little difficulty will be found in hitting on the right degree of density. The removal of the unaltered bromo-iodide of silver, or *fixing*, is best effected by cyanide of potassium, and then the picture must be thoroughly washed.

For the purpose of removing any trace of deposit on what should be clean glass, and which, although it may not be visible in the transparency, would make itself unpleasantly seen after fixing, the picture must be flooded for a few seconds with an aqueous solution of iodine in iodide of potassium of the colour of sherry, very thoroughly washed, again subjected for a very short time to the action of a weak solution of cyanide, and again well washed.

If the picture is to be transferred to a piece of pottery it should have been either vignetted or printed under a mask in the camera; but if it be transferred to an ordinary tablet it may be allowed to cover all the glass. In either case the film all round, for at least the eighth of an inch, is to be removed from the plate, which is then placed in a bath of dilute sulphuric acid of the strength of about one to thirty, and may be left there for any length of time. The object of the acid bath is to harden or toughen the film and facilitate its removal from the glass, and it will have been accomplished when the edges begin to wrinkle and show symptons of separating.

The plate must be removed from the solution and carefully washed by a gentle stream of water. It is then held between the thumb and middle finger—the glass side next the hand, and the lower edge just touching the surface of water in a dish—and gradually lowered till the whole film is in contact with it; that is, till the plate, film side down, is held horizontally on the surface, or just under the surface, of the water. If the glass be now somewhat rapidly raised by an inverse motion the film will be left floating on the water, and must be again transferred to the plate by slipping the glass under it and gently lifting both together. The film will now be reversed, the object being to apply a gentle stream of water to the side previously next the glass, for the purpose of removing a number of minute air-bubbles which, if allowed to remain, would seriously interfere with the success of the work.

The next operation is that of toning, by which is meant the complete removal of the silver, and substituting in its place metallic iridium, platinum, uranium, gold, &c., or mixtures of these metals. Here there is room for much further research and experiment, as well as for the exercise of taste and judgment, as various metals give diverse colours, and almost any desired shade may be produced by suitably-adjusted mixtures. A toning solution which works very well may be made as follows:—

A saturated solution of the double chloride of iridium and sodium	2 drachms.
Solution of chloride of gold (one grain to the drachm)	2 "
Water	12 ounces.

The film is transferred to this solution, and the process of substitution carefully watched. Experience alone will enable the operator to know when it is complete; but I may say, generally, that it is indicated by a peculiar transparency or brilliancy seen by reflected light in the shadows of the picture. The toned film is now removed from the solution and placed in a dish of water, where it is well washed, and then transferred for a few minutes to a ten-grain solution of hyposulphite of soda, in order to remove any trace of chloride of silver that may have been formed and left, and again well washed. If, at this stage, the colour should be too dark or cold, a brownish shade may be produced by a short immersion in a five-grain solution of ferridcyanide of potassium, or of a mixture of that body and nitrate of uranium. It must be again washed, and may then be transferred to what is to be its permanent support. Whatever that may be, the method of treatment is the same; and therefore I shall suppose it is an ordinary enamel tablet, either of copper with a coating of glaze, or an opal glass plate—both of which are articles of regular commerce.

The film is placed in a dish of water sufficiently deep to make the operation easy, and the tablet, held between the fore fingers of each hand, is slipped gently under it. It is then slowly raised, so as not to make a current in the water, until it is in contact with the film; and to keep it in its place the thumb of one hand is placed on the edge of the tablet and both slowly lifted out of the water. By a little practice this operation will be very easily performed, and the film will adhere firmly and smoothly to the tablet. Overlapping edges are then rubbed off, and the pictured-covered tablet, after being dried before an open fire, is ready for the next operation, which is the burning off of the film which has hitherto kept the metallic powder in the position necessary to form a picture.

For the remaining stages of the operation a muffle furnace of some kind is required; that is, a means of subjecting the picture to any required degree of heat without bringing it in contact either with the fire or the products of combustion. Of such furnaces many forms have been introduced, and they may be purchased at from a few shillings up to many pounds; but probably the best and most convenient for photographic enamelling is that of Fletcher, of Warrington. It has the advantage of taking up little space, can be put in operation by simply turning on and lighting the gas, and may be used on an ordinary table. With such a furnace the whole firing of enamels may be easily and satisfactorily accomplished.

The film having been placed on the tablet and dried, the next step is to burn off the constituent parts of the collodion. This is effected by laying the tablet on a plate of fire-clay and placing it in the muffle of the newly-lighted furnace, the object being to heat it gradually up to the temperature at which the organic matter will get oxidised and pass away as carbonic acid and other gases. For this purpose the tablet is gradually pushed nearer and nearer the hottest part of the muffle until nothing is left but the metallic powder adhering more or less firmly to the glaze of the tablet. When this is accomplished the tablet is removed and allowed to cool, after which it is ready for the final operation of glazing or *burning-in.*

The glaze or flux, as I have already said, consists of such a mixture of silicates and metallic oxides as will yield an easily-fused, but hard, glass. Almost every enameller has a formula of his own, and often much labour and skill are expended on the mixture and grinding of such preparations. Cooley gives several formulæ, one of which may be transcribed as an example, although, for many reasons, it is much better to purchase the article ready made:—Red lead sixteen parts, calcined borax three parts, powdered flint-glass twelve parts, powdered flints four parts. Fuse the whole in a crucible for twelve hours, and pour into water. Then reduce to an impalpable powder in a mortar and by washing and subsidence. It is said to be improved by frequent fusing and powdering.

The article supplied by Messrs. Hancock and Son, of Worcester, under the name of "transparent glaze," will be found to answer admirably; and, although various operators may have different

methods of spreading it over the surfaces to be glazed, I believe that the glazing emulsion published by Mr. Tunny, in a former edition of The British Journal Photographic Almanac, is generally admitted to be one of the best. It consists of one ounce of the transparent glaze, made into a smooth paste, with two ounces of alcohol. Sufficient alcohol is then added to make it run through a flannel filter, and one and a-half ounce of plain collodion is afterwards added.

The glazing emulsion thus made is poured over the surface of the object to be glazed and allowed to dry; then the tablet is returned to the muffle, which must be previously raised to a red heat. In about a minute the fusion will be complete, and the image, previously somewhat dull, will have assumed the beautiful brilliancy characteristic of a first-class enamel, free from speck or blemish, and of a fine dark but warm tint, if the various stages of the operation thus described have been correctly performed. Success, however, depends much on the exercise of the greatest care in every part of the work, and especially on the purity of the water employed. So much is this the case that it is advisable to use distilled water, particularly during the toning and the after-washing, the slightest trace of certain salts often exercising an injurious influence on the finished enamel.

As already indicated, I do not know whether the process as here described is at all like that practised by those who have added enamelling to their business, or whether it is the best that has been devised. I give it simply as one that in the hands of any careful manipulator will give good work, and which, if adopted, and the branch pushed assiduously, would not fail to pay. John Nicol, Ph.D.

NOTES ON PASSING EVENTS.*

By a Peripatetic Photographer.

There are two things—nay three—concerning ceramic photography about which I am a little uncertain. The first is a belief in a statement recently made by a contributor to this Journal concerning the great ease with which ceramic or burnt-in photographs can be made. His words are:—"Anyone who can make a good negative and a first-rate transparency will, after a few trials, find enamelling an easy operation." Now I have heard of photographers of great manipulative eminence—photographers, too, whose ability has been fully recognised by the author of the article in question—who have for several years been endeavouring to overcome the inherent difficulties which prevented their production of works by a process thus "easy." The painting of a miniature has been said to be an "easy operation;" but I imagine that, either in the effectual accomplishment of the latter or the former class of work, a certain exceptional kind of skill (not to be gauged by the ability to take a good negative or transparency) will be required. A second point about which I am uncertain is this:—Suppose that every photographer throughout the country found it to be the easy thing alleged, would a demand on the part of the public be created for such enamels? I believe it is a fact that the few who can execute good work of this character find that the public do not care much for them. In comparison with the demand for photographs of the *carte*, cabinet, or enlargement class, that for enamels might be set down at almost *nil*. But my third "difficulty" is one of a more serious nature, and I indicate it in the form of a question—Are photographic enamels necessarily permanent? I do not here use the term in the sense in which an irate gentleman, at the "Brighton dinner" party of a few years ago, employed it when he said—"Just put an enamel under your heel, and see what would become of it!" What I mean is this—Are the pigments of which the image in the enamel is composed, which form the blacks and demitints that are vitrified by the action of heat, so permanent as to withstand the destroying action of light or atmosphere? I possess a photo-enamel which several years ago was by many degrees purer and more brilliant than it now is, and this is also the opinion of others beside myself. We all know there are thousands of photographs that have been protected from the atmosphere which have faded so much as to become invisible. Neither has a strong, thick, hard varnish, aided by an air-tight glass cover, proved sufficient to prevent the total destruction of glass transparencies when prepared in a certain manner; and how do we know that the metallic oxides or other salts of which a ceramic image is composed may not likewise succumb to the action of light and time? I make these remarks in order to serve as a sort of "wet blanket" to those who are inclined to say that because a photograph is burnt-in it is, *therefore*, permanent.

I wish writers in American scientific journals would draw milder on metaphors when writing for simple folks on *this* side of the "onlimited Atlantic." An American writer, who describes the Centennial Exhibition, speaks in a very lachrymose manner concerning a frame of daguerreotypes of persons whom he once knew, but some of whom "have passed over Jordan's *stormy banks*, and now *stand* on the other side." Those who remain here, and are not standing on the other side of that turbulent stream, find the "almond tree begin to flourish," and soforth. I am not quite so obtuse as not to know what the writer is driving at, but in this country simpler and less nebulous language is invariably employed by scientific writers.

Of a truth photography is certainly declining at the meetings of the British Association. Nothing whatever in the nature of a photographic paper has this year been read by any Englishman, nor even by a single Scotchman. One might have expected that in a city like Glasgow, which contains so many excellent chemists, able photographers, and admirable men of business, some kind of appearance, however small, would have been "put in" at the sections; but, beyond organising an exhibition of works consisting in most part of photographs of local scenes by local artists, for the laudable purpose of allowing the numerous visitors to see how high such artists stand in the world of artistic photography, nothing was done. In days of yore many important discoveries in photography were communicated to the world at these meetings; but since the establishment of photographic societies, and more especially since the death of Herschell, Brewster, Claudet, and other *savants* of that class, investigators of the modern school prefer communicating their discoveries to their brethren through more direct channels than is afforded by the British Association. It is on record that, during the reading of an important paper on an interesting phase of photography, a few years ago, by a well-known F.R.S., there were only seven persons present, and of these four were young ladies belonging to a neighbouring boarding-school. Who, I ask, would care to throw away papers upon such a limited auditory?

* Concluded from page 475.

PHOTOGRAPHS ON WOOD FOR ENGRAVING.

The boxwood block is one of the most difficult surfaces on which to photograph, on account of its uneven grain; and in large blocks, where there are a number of small pieces bolted together, the difficulty increases, as no two pieces are alike in grain. There are two things demanded by the wood engraver—one being that the photograph shall not "shell" under the graver; the other that it is impossible to pencil on the block as in a drawing. Many attempts have been made in this direction, but with little, if any, success.

The simplest method, perhaps, of photographing on wood is the following:—Take a negative of any subject and fix it against one of the studio windows; place a piece of ground-glass behind it, and outside the window reflect light through it at an angle of 45° with a piece of white cardboard or, better, a piece of looking-glass. Cut out a hole in brown paper the size of the picture, so as to cut off all light but that coming through the negative. Now focus the copying camera sharply. Prepare a plate in the ordinary way, taking care to use thin collodion that will take a good picture. The time of exposure can only be arrived at by practice. With Ross's $8\frac{1}{2} \times 6\frac{1}{2}$ triplet, medium stop, sixty seconds in good light are sufficient. Develope with—

Iron	15 grains.
Acetic acid	1 drachm.
Water	1 ounce.
Alcohol	*quant. suff.*

Fix in hypo.; wash well, and tone with the acetate and gold bath, which must be rather weak and old. When the picture is toned it should show the same colour on both sides of the glass. Wash well; now put the plate into a bath of water to which a few drops of hydrochloric acid have been added; scratch round the image with a sharp knife (rather larger than the wood block) and the film will now leave the glass and float on the water. Then take the wood block, rub on some flake white mixed with a little of Thomas's dry albumen and a little water and work it well over the wood, after which rub off all that will come away with the palm of the hand. When dry plunge the wood under the film, and, having got it into the right place, gently raise the two out of the water. Place the block between blotting-paper and well press. After this wash the block in alcohol to absorb the water; trim the edges of the film, and, when dry, the collodion will be found firmly adhering to the wood, and will not cut up under the tool. The objection to this process is that it cannot be pencilled on; but it will answer well where the original photograph is quite perfect.

The other process is one that gives a good surface for the pencil. Take a negative, which must be reversed. The best way to do this is to expose the back of the plate in the dark siide; when the pic-

ture is developed it will be found to be the same way as the original. The negative required should be sharp, and without any deposit in the shadows. It is better to work with a strong developer that has ripened to about the colour of old collodion. To prepare the block, take flake white and fine brick-dust, or bath brick, rub it well over the block, and then rub it off with the palm of the hand. When dry, coat the wood with—

White india-rubber .... 1 grain.
Chloroform .... 1 ounce.

Take—

Alcohol .... 1 ounce.
Ether... 1 „
Pyroxyline .... 7 grains.

This gives two ounces of plain collodion. Now make up in three bottles—

1. Nitrate of silver................................ 120 grains.
Water .... 120 minims.

2. Chloride of ammonia.......................... 64 grains.
Alcohol .... 1 ounce.

3. Tartaric or citric acid .... 64 grains.
Alcohol .... 1 ounce.

To two ounces of plain collodion add one drachm of No. 1, to which has been previously added one drachm of alcohol; shake well; then add one drachm of No. 2, shaking well all the time; and, lastly, half-a-drachm of No. 3, letting it stand one hour, and filter through cotton wool. It is now fit for use. Then take the wood block and coat it in the same way as a plate, and dry gently before the fire. The block is now ready to be put into a printing-frame of the ordinary kind, with stout plate glass in front. Bring the block into position on the negative. Now take slips of wood and glue them on the negative (this will enable the block to be taken up and examined); bring down the bars of the frame and expose in the shade. These pictures must not be over-printed, as they lose little or nothing in the toning and fixing.

When the block comes from the printing-frame it should show a beautiful picture, blood red. It must now be put into the toning and fixing bath—in one bath—without washing. The one given on page 198 of The British Journal Photographic Almanac for 1876, with a slight modification, will answer. It should be as follows:—

1. Chloride of gold .... 3 grains.
Chalk... 15 „
Water... 5 ounces.

2. Sulphocyanide of ammonium.................. 25 grains.
Carbonate of soda .... $2\frac{1}{2}$ „
Hyposulphite of soda ....240 „
Water... 5 ounces.

Toning is best done in a flat dish, laying the block face downwards till toned; it is then well washed under the tap for about three minutes, taking care to wet the back all over, or water stains will appear. On this surface a pencil will take on washes of india-ink. A considerable number of the Landseer sketches which are appearing in the *Art Journal* have been done by this process.

Edwd. Pocock.

FOREIGN NOTES AND NEWS.

A Mountant for Photographs that will Keep for a Considerable Time.—Dr. Eder's Double-Salted Collodions in the Market.—An Expensive Secret Process.—The Silver Product of America.—Dr. Schnauss's Experiments with "Agar-Agar."

A paste for mounting photographs is described in Moll's *Photographischen Notizen*, by one Herr Straub, who pronounces it of such excellence that whoever uses it once will never after use any other. It is said to be especially adapted for mounting carbon prints. The paste is composed of—

Best Bermudas arrowroot .... 52 grammes.
Gelatine .... 6 „
Alcohol .... 35 „
Carbolic acid .... 6 drops.
Water .... 525 grammes.

It is most important that the arrowroot should be perfectly pure, as no good results can be obtained from arrowroot adulterated with potato flour. To prepare the paste:—Stir the arrowroot to a pulp with about forty grammes of water; then add the gelatine, chopped fine, and the rest of the quantity of water mentioned above. Then, while stirring steadily, bring the whole to the boil and let it boil four or five minutes, otherwise the paste will not be good; after which set it aside to cool. As soon as the mixture becomes lukewarm the alcohol, previously mixed with the carbolic acid, must be carefully added in a thin stream, the paste being meanwhile steadily stirred. The paste is then ready for use, and one has now about half a kilogramme of the best mounting material, which may be stored in a wide-mouthed bottle, well corked to keep out dust. The quantity for daily use to be taken as required from the store-bottle. This paste is said to be beautifully smooth to work with, to adhere well, to be especially free from all granularity and knots, and to keep in good condition.

We understand that in anticipation of a demand for Eder's double-salted collodion, Herr A. Moll, of Vienna, has placed in the market a quantity of the double salts most highly recommended by Dr. Eder, namely, single bromide of ammonium and cadmium, and double iodide of ammonium and cadmium.

A Russian photographer, of Nijni-Novgorod, has, according to the *Photographisches Archiv*, a secret process by means of which, with a common lens, he can take groups of extraordinary depth and sharpness. He is stated to be willing to sell the secret, but demands 100,000 roubles for it, and has already declined an offer of 5,000 roubles!

In the same journal we see the silver product of America, from its discovery by Columbus to the year 1873, estimated at 715,000,000 dollars.

In the *Archiv* Dr. Schnauss says he has lately been experimenting with the substance called "agar-agar," which has been several times mentioned in these *Notes*, in order to see whether it is really likely to be of use in photography. It seems that agar-agar comes from India in two forms—as four-sided columns about a foot long, and as long threads. The first form was that selected by Dr. Schnauss for his experiments as likely to be best adapted to the lichtdruck process. Agar-agar is a very light substance, and should not, Dr. Schnauss says, be mistaken for a sort of glue, as photographers are apt to do, on account of its being used as a foundation for jellies for the table. It contains no nitrogen, and its composition resembles that of the fruit jelly, pectin, or, according to Reichardt Pararabin, it is rather an almost pure hydrocarbonate. It is not to be compared with gum arabic, because it loses all its adhesive power, and this seems a sufficient reason for regarding its employment in lichtdruck as very problematical. Then it is exceedingly difficult of solution, even in boiling water—a difficulty which is certainly lessened by the addition of a few drops of muriatic acid; but then that necessitates a proportionate increase of the quantity of water, so that after drying there remains only an extremely thin film upon the glass plate. But the worst of all is that it stiffens almost instantaneously, so that Dr. Schnauss did not succeed in coating equally very warm, medium-sized glass plates with an almost boiling solution. Despairing of being able to employ agar-agar by itself—at least in the lichtdruck process—Dr. Schnauss turned his attention to it as a support for the silver salts in the negative process instead of gelatine, especially for dry plates. The result was that in a remarkably short time the agar-agar decomposed the silver salts in the dark, so that not even once was a carefully-washed plate retained until perfectly dry. When still damp and exposed as collodion plates, immediately after being silvered they were exceedingly sensitive to light, and when developed with a solution of acetic and pyrogallic acid gave very intense negatives. The action of the developer, however, still continues, even after having been well washed, and, singularly enough, the bromo-iodised silver film can scarcely be removed by the ordinary fixing materials. Even cyanide of potassium and a hot concentrated solution of hyposulphite of soda were unsuccessful, or only partially successful, in dissolving the haloid silver salts from the enveloping agar-agar. While drying the film has two hydrous conditions:—at first it is swollen up like a jelly; but, after standing for some hours in a warm place, it loses the greater part of its water, and a thin damp coating still remains for some time before it dries up completely. In this second state of dampness the film, previously furnished with the proper quantity of bromo-iodide of potassium, is silvered, exposed, and developed. It then possesses in a high degree the power of absorbing the various solutions. In conclusion, Dr. Schnauss thinks that if one can discover a way of coating plates *equally* with agar-agar solutions, it is possible that these plates, from their sensitiveness, may become very useful for taking negatives by the *wet* process, if one is careful to use warm fixing baths.——With that single exception, however, it appears to be evident that the photographer had better leave agar-agar to the tender mercies of the *cordon bleu*.

SCIENTIFIC JOTTINGS.

We have, in a former number, remarked upon new sources of tripoli, and we have now a note to make of a still further source of supply of this very useful aid to photographic operations. A correspondent of

the *Chemical News* states that, in examining a portion of the deposit dredged from the bottom of Lake Oich (one of the chain of lakes forming the Caledonian Canal), he found it to be nearly pure tripoli. One would think that the price of this rather expensive powder should reach a lower level.

The subject of sulphur acids in the atmosphere is one of great importance to the photographer, and of late many experiments and calculations in connection with it have been made. We have already called attention in our *Foreign Notes and News* to the subject, and now return to it to note the results of other experimentalists. In Dingler's *Polytechnisches Journal* will be found a calculation by Knapp as to the amount of sulphur to be found in the atmosphere from the burning of coal. 238 analyses of coal alone were made, the mean giving 1·7 of sulphur present, seven-eighths of which, when the coal is burnt, pass into the atmosphere. Thus, in the burning of 1,000 tons of coal fifteen tons of sulphur are turned into the atmosphere as sulphurous acid, which soon becomes sulphuric acid. London air is estimated to contain 1·67 grammes of this acid in every thousand cubic metres, while Manchester, with its mills and manufactories, poisons its air at the rate of 2·67 grammes, and its rain water contains one part of sulphuric acid—that is, to use a popular term, oil of vitriol—in every hundred thousand. Leplay calculates that in South Wales alone 92,000 tons a year of sulphurous acid are sent into the air; yet, notwithstanding all this immense aggregate, it is estimated that a larger proportion by far of putrid gases are evolved from closets, street gutters, and the soil of large cities—indeed, to such an extent as to render the other causes insignificant in comparison! Can it be wondered at that the delicately-balanced image of a silver print should succumb to these deleterious influences sooner or later?

A number of most interesting communications relative to albumen have appeared lately. In Dingler's *Journal*, just mentioned, will be found the results of an inquiry by G. Witz, with respect to the sources, &c., of albumen, and various economic statistics are also given. He says the average gross weight of a hen egg is from forty-five to sixty grammes, the proportion of yolk and white varying with the season, the proportion of the latter increasing in spring, and that of the former increasing in summer. Out of 366 eggs, of all sizes, he obtained a mixture which deposited ten per cent. of impurities upon standing, the remainder furnishing one kilogramme of pure, dry albumen. About four kilogrammes of yolk were obtained (this material is mostly used by the leather manufacturers). In Alsace alone, in the year 1860, thirty-seven-and-a-half millions of eggs were used in the printing industry. The Alsatian makers offered a prize for the discovery of a cheap substitute for egg albumen, but, so far, without any successful response. To a certain extent blood albumen displaces the egg albumen, but its colour militates against its general adoption. The blood from one ox has been calculated to yield 400 grammes (or not quite a pound) of dry albumen, but more recent experiments point to double this quantity.

As is well known, dried albumen is easily obtained in commerce at the present time, ser-albumen obtaining about half the price of ov-albumen.

The following will be found a most useful list for gauging the amount of solid albumen containing fifteen per cent. of hygroscopic water in white-of-egg solutions, at a temperature of 62° F.:—

Albumen in 100 parts.	Specific gravity.
1	1·0026
2	1·0054
3	1·0078
5	1·0130
10	1·0261
15	1·0384
20	1·0515
25	1·0644
30	1·0780
35	1·0919
40	1·1058
45	1·1204
50	1·1352
55	1·1511

Some remarkable and highly-interesting experiments have been published by the compiler of the above table, G. Witz, in conjunction with J. Wagner, with regard to rendering coagulated albumen soluble. They find that pepsine—applied by adding small pieces of calves' or pigs' stomach, distributed in water containing a trace of hydrochloric acid—is an active agent for the purpose, and by a couple of days' digestion renders more than one-half of a coagulated albumen soluble once more. The solution so obtained is odourless and almost colourless, and has the property, when neutralised by ammonia, of again becoming coagulated by heat or by the addition of alcohol, unless the original insolubility had been caused by heat, in which case the redissolved albumen is not coagulable by heat. Colosanti has shown that three weeks is almost the extreme time which an egg can be kept before hatching; hence we may consider that when they are a month old they begin to be unsuitable for photographic purposes.

Many substitutes for cotton-wool have been proposed for the making of pyroxyline, such as linen rags, sawdust, flax, paper, &c., &c., the last-named material alone being the only one used practically, though it is by no means certain that sawdust might not supply a good pyroxyline with organic reactions for special purposes. But the most promising material of all is offered in cellulose prepared from wood, which is now made for the paper manufacturers in very large quantities. The mechanical wood tissue obtained by grinding wood does not answer their purpose at all; but the cellulose prepared by chemical means is a substance whose qualities render it suitable for the manufacture of the highest quality of paper. So far back as 1868 a company made paper from this material alone, without the addition of rags. Three years afterwards five large mills were started (by an English company) in Sweden; and in Germany, at the present time, there are six factories in which the same process is carried out. It is somewhat as follows:—The wood of pine and fir trees (oak is no use whatever) is cut into small pieces a little less than an inch long by a half wide and a third thick, which are then comminuted by passing them into a machine very like a large coffee mill. It is then boiled, under a pressure of ten atmospheres, in a solution of caustic soda for about four hours. The residue is well washed, bleached, pressed, and lastly dried and cut up into sizes suitable for packing. It is also sent out unbleached, in which form it is used for a variety of purposes, besides making brown paper. This is the form we should be inclined to think would be most suitable for the manufacture of pyroxyline. The greatest demand hitherto has been in Germany and Austria, the former country producing, it is estimated, 250,000 tons of paper a year, and Austria about 100,000 tons. If only one-fifth part of this be made with cellulose that would mean 70,000 tons of this material, or 280,000 tons of wood.

The presence of methylated spirit in many photographic preparations may be a sophistication or not; at any rate, we think it is never an advantage, and hence we transcribe from the *Pharmaceutical Journal* particulars of a process for determining its presence or otherwise in a suspected liquid:—Five ounces of the suspected spirit is distilled twice in an air-tight still and condenser furnished with a mercury valve to check evaporation, the first quantity having been rendered alkaline, the second acid, and about two-thirds being distilled over each time. The distillate is then shaken up with dry potassium carbonate, and again twice distilled, half an ounce being driven over each time. This, which then contains any methyl alcohol originally present, is diluted with water to ten per cent. strength and the alcohol determined—first, by specific gravity; second, by Giessler's vaporimeter; third, by oxidation. The difference between the amount indicated by oxidation and that shown by specific gravity gives a rough indication of the methyl alcohol present.

Meetings of Societies.

EDINBURGH PHOTOGRAPHIC SOCIETY.

The first ordinary meeting after the summer recess was held at 5, St. Andrew-square, on Wednesday evening, the 4th inst.,—the President, Dr. Thomson, in the chair.

The Chairman said that before the business of the evening commenced he must congratulate the members on the large attendance at that the first meeting of the session. It was always gratifying to see meetings fully attended, and especially so at the commencement of a season. The summer then just coming to a close had been on the whole favourable for landscape work; yet, from some cause or other, there had been fewer outdoor meetings than in former years. That was in one sense matter for regret, as it was desirable that members of the Society should give a good account of themselves at the forthcoming exhibition. He hoped that the large attendance that evening would prove a good augury of the success of the session, not only in the usual work with which most of the members were now pretty well acquainted, but in the not less important arrangements required to bring the exhibition to a successful issue—a kind of work of which, as a Society, they had little experience. One thing was quite certain—there would be a very large amount of hard work to be done, and he hoped every member would do his best to assist the Council in the somewhat arduous undertaking.

The minutes of previous ordinary and outdoor meetings were then read and approved, and Messrs. Alex. Ayton, Murray, and George Scott were admitted ordinary members.

Mr. W. H. Davies read a series of suggestions as to "What should be done to make the Exhibition a success." He said that success, such as the members ought to aim at, depended on two things. First, the Exhibition must be made sufficiently extensive, varied, and attractive to be worthy of the attention of the general public; and, secondly, every effort must be made to impart to it the popularity that alone could secure financial success. Personally, he believed that, now that the little differences on matters of detail which had for a time somewhat disturbed the usual harmony of the Society had been amicably adjusted, the well-known energy of those in whose hands the bulk of the preliminary work lay was a sufficient guarantee that everything feasible would be accomplished, and his object then was more to stir up the members generally to aid the Council than to suggest anything to

the Council itself. He then entered somewhat minutely into what he considered the best arrangements, both to get the exhibition into working trim and to get up the required interest in the public mind to ensure the desired attendance of visitors; but most of the suggestions possessed only local interest, although one relating to the formation of a catalogue is well worth the attention of the promoters of exhibitions generally. One of the conditions to be observed by exhibitors was that the title of the picture, name of the artist, and such other information as might be thought necessary should be written on the back of each frame or case; and he (Mr. Davies) proposed that as the pictures were unpacked slips of paper containing copies of such information should be attached to the front of each. Then, after the pictures were hung, and while being numbered, a corresponding number should be marked on each slip. Those slips were then to be taken off and handed to the printer as MSS. for the catalogue. Another suggestion, which may be useful to other societies, was to utilise such lantern pictures as might be sent for exhibition, by devoting one hour on several evenings during the time the exhibition was open to a practical illustration with the lantern, and a descriptive lecture in the style long so popular in the Edinburgh Photographic Society.

The CHAIRMAN said they were much indebted to Mr. Davies for the thoroughly practical suggestions he had made, and was sure the members would be pleased to hear that the Council had associated him with the committee entrusted with the business arrangements, as there was no one in the Society who had such experience, or was so able to help in that kind of work. He thought that, for the information of the members present, it might be well if the exhibition secretaries would give a rough outline of what had been already done.

Dr. NICOL and Mr. DOBBIE said that their work hitherto had consisted, mainly, in sowing broadcast the information that an exhibition was to be held, and the conditions on which pictures would be received. That had been done by the issuing of copies of the circular formerly submitted to the Society. Copies had been posted to nearly every photographer in Britain, America, India, and the colonies, while the continent had also, so far as practicable, been attended to. Secretaries of societies, editors of photographic publications, and others likely to take an interest in the matter had been furnished with circulars for distribution; and, from the numerous replies and queries that were daily coming to hand, they had no doubt that every likely man had already been made acquainted with the Society's wish to make the exhibition one of the best that had yet been held.

On the motion of Mr. DOBBIE, a suggestion of Mr. Davies's to appoint a small committee to endeavour to collect as many specimens of earlier processes as possible was resolved on, and the committee appointed; and we are requested to say that the Council will be extremely obliged if those possessing anything unique in this direction, and who may be willing to lend it for exhibition, will kindly communicate with either of the secretaries.

Messrs. TURNBULL and MATHIESON then made a communication on their "Experience in Working Emulsion Plates." They said that for a long time they had successfully wrought the favourite beer-and-albumen process, but some time last year began to wish for something more sensitive. After the communication to the Society by the Rev. H. J. Palmer they went very heartily into gelatine, so strongly recommended and successfully worked by Mr. Palmer; but ultimately they abandoned it in consequence of the difficulty of getting anything like suitable density, or preventing the frilling and cracking up of the film. These objections were equally strong with respect to emulsions made by themselves or from the pellicle supplied by Mr. Kennett. Their attention was then directed to collodio-bromide emulsion, which, as they were at present using it, was all that could be desired. After numerous experiments they had discarded all modern innovations, or so-called "improvements," and were quite satisfied that for all ordinary work the original formula, or something very near to it, was the best. The formula they now used was published in THE BRITISH JOURNAL OF PHOTOGRAPHY a number of years ago, and consisted of—

Cadmium bromide	6 grains.
Ammonium bromide	3 ,,
Silver (to each ounce)....................	11 ,,

The emulsion thus made kept for two or three weeks at least, was rapid enough for anyone who sought good results more than many pictures, and under a suitable developer acquired density readily; in fact, that the development was almost as rapid as with wet collodion. For some time they had used tannin as a preservative; but certain markings and blemishes had been attributed to it, and now they used ordinary draught bitter beer, and found it quite satisfactory. They further stated that, in their opinion, the sensitiveness of gelatine emulsions had been much overrated, and handed round three negatives—a gelatine, collodion emulsion, and a washed emulsion negative—that had each got the same length of exposure, intentionally short. The gelatine was undoubtedly the best, but very little better than the ordinary emulsion, while the washed emulsion was very much under-exposed. They then proceeded to develope a plate, using a sixty-grain solution of carbonate of ammonia to which at first only a few drops of a sixty-grain alcoholic solution of pyrogallic acid was added—bromide, in the case of a beer preservative, being unnecessary—and the image almost immediately appeared. When the detail was pretty fully out, but still quite thin, a few more drops of the pyro. solution were added, and under that the negative rapidly acquired sufficient density. A large number of negatives, varying in size from 7 × 5 to 16 × 13, were handed round for examination, and were very much admired.

A number of the members present expressed themselves much pleased with the process as illustrated and with the results exhibited, intimating their intention of adopting it.

Mr. AIRD had experimented a good deal with the emulsion as now wrought by Messrs. Turnbull and Mathieson, and found it quite rapid enough for ordinary purposes. He, however, preferred tannin as a preservative, and was convinced that it was more rapid than beer. He (Mr. Aird) also exhibited three negatives similar to those shown by Messrs. Turnbull and Mathieson, and it was generally admitted that the ordinary emulsion was quite as well exposed as the gelatine, whilst the washed emulsion was poor and thin, and wanting in detail.

The CHAIRMAN said that there could be but one opinion of the process, and the care and ability of the operators by which such beautiful results had been produced. He was glad to hear so many members say they should give the emulsion a trial, as he did not think its merits had been, as yet, sufficiently appreciated in Scotland. His advice to members would be to discard all, or nearly all, previously written on the subject during the last few years. The fact was that the emulsion process was very much like the wet collodion process in this—that both were given to the world in as nearly as perfect a condition as possible, or, at least, that no real improvement had been effected on either. The emulsion process as given by Sayce and Bolton twelve years ago was, with the exception of requiring to be strengthened in silver bromide a little, vastly superior to anything that had been the outcome of much or all of the trash since written regarding it.

Mr. LAING showed a negative with an image similar to that exhibited as a "puzzle" some time ago by Mr. Dallas. He explained that in trying to copy a picture with wet collodion he had given an exposure of half-an-hour, and that on development not a trace of the picture had appeared—nothing, in fact, but the abnormal image now shown—whilst a second plate under similar conditions had yielded a good negative.

The plate was examined with much interest, but no suggestion of a probable cause was made.

A number of pictures, the contributions of the Secretary and others, were ballotted for, votes of thanks given to all those who had taken part in the evening's proceedings, and the meeting adjourned.

THE last outdoor meeting of the season of the same Society was held on Friday, the 6th inst., the locality chosen being Halton House and grounds. The party drove from Princes-street, starting at 9.30 a.m., and returning between 4 and 5 o'clock p.m.

Halton House (formerly the seat of the Lauderdale family, at one time the residence of Jeffrey, and now occupied by Mr. Findlay, of the *Edinburgh Scotsman*) is a curiously-interesting pile—a combination of the old Scottish baronial house and the Scoto-French chateau with considerable later additions in the *Renaissance* style. The house is more interesting than beautiful, but affording subjects for a number of excellent pictures. The grounds are extensive, and contain some very fine old trees and a picturesque sheet of water, which, together provide "food" of a most desirable kind for the camera; and yet it is somewhat strange that, although only eight miles west of Edinburgh and not far from one of the three great roads connecting that city with Glasgow, it is a *terra incognita* to many of even the landscape photographers of Edinburgh. The pleasure grounds of Halton House originally extended to 240 acres, and included magnificent trees, numerous lakes, fountains, ornamental terraces, and pavilions; but, like most other residences of its kind and time, it is now sadly shorn of its former glory. Enough, however, remains to make it well worth the attention of the photographer; and, now that the Edinburgh Photographic Society has found it out, it is likely to become a favourite haunt of the "camera men."

The day was, on the whole, not unfavourable for photographic work, although the light was weak and somewhat irregular, requiring exposures of from ten to thirty minutes with both emulsion and beer plates; but, nevertheless, a number of good negatives have been secured.

When such long exposures are necessary the time is apt to hang somewhat heavily on hand; but one of the party hit on an excellent expedient by which to while it away, namely, the telling of stories or incidents in connection with the building. One of these caused at the time of its occurrence considerable excitement in Edinburgh and elsewhere. It appears that a Captain Davidson, to whom the property at one time reverted, resolved, as far as possible, to restore it to something like its former grandeur, and in the attempt got himself into very embarrassed circumstances. He was for a time residing with his family near Herne Bay, on the Kentish coast, and went to bathe one day, but did not return. His clothes, watch, &c., were subsequently found, and of course it was supposed that he had been drowned. This was the more readily believed, as he had spoken to the toll-keeper on the pier, to whom he had paid the usual toll of a penny on going through, and who had not seen him return. He had also spoken to some workmen on the pier. His life had been very largely insured shortly before, and in due course the company paid the amount and the affair was forgotten, except by those nearly connected with him. It turned out, however, that he had

not been drowned. He went to the end of the pier, and divesting himself of his clothes and watch laid them where they were found. Under his ordinary dress he wore one similar to that of the workmen employed on the pier, and in it he passed through them and through the toll-gate unsuspected. He went to France and resided there for a considerable time. By-and-by his family visited Paris, where they were discovered by the Captain, who took care not to make himself known to them. He haunted their hotel, and had the pleasure of seeing his wife and children riding out. So complete was his disguise that he one day actually handed his daughter into the carriage without being discovered. Years rolled on, and the family lived in seclusion in Edinburgh; but the Captain could not rest abroad. He returned to Edinburgh, and used to sit for hours watching the old house from the opposite side of the street. At last he could withstand it no longer, and forwarded a communication to a sister of his wife. How the insurance office beoame aware of the fraud is not known; but they did, and immediately obtained a warrant for his arrest. His creditors seized everything belonging to the family. The estate was sold, of course, and general ruin followed.

Members of societies who attend outdoor meetings, and give long exposures, should make a note of the foregoing, and always see that the party includes a good story-teller.

Correspondence.

GELATINE EMULSIONS.

To the EDITORS.

GENTLEMEN,—Will you be kind enough to allow me space to make a few remarks on emulsions for the benefit of gelatine emulsion workers and experimentalists? I have some emulsion before me, while writing, that has been prepared over seven weeks, and it is equally as manageable as when first prepared. I am washing it again to get rid of free bromide and excessive preservative that has been added, and which entails a lengthened exposure. I can make it as rapid as I please.

The first formula gives a thin image, but is equal in rapidity to most others:—

Gelatine (French)	40 grains.
Gum arabic	5 ,,
Water	$1\frac{1}{2}$ ounce.
Alcohol	1 ,,
Bromide of cadmium	35 grains.
Fused nitrate of silver	31 ,,

Second formula:—

French gelatine	60 grains.
Glucose	10 ,,
Water	$1\frac{1}{2}$ ounce.
Alcohol	$\frac{1}{2}$,,
Bromide of ammonium	$13\frac{3}{4}$ grains.
Fused nitrate of silver	$23\frac{1}{4}$,,

The glucose must be added after washing or it will be dissolved. I have further added to each batch half-a-drachm of tincture of cantharides, and one grain per ounce of bromide of ammonium.

These two emulsions have been mixed some time and work well together, although slow, and the film is apt to frill. Rubber as a substratum impairs sensitiveness, and some one has said as much with regard to india-rubber bands.

Mr. M. Carey Lea some time ago complained of red fog. I have only met with it when using bromide of cadmium. It is caused by the plate getting too warm during development. I on one occasion developed some plates in the presence of a friend, holding the plate by one corner, and red fog set in from that corner and spread rapidly. I next used a quart jug as a plate-holder. Red fog again—not this time from a corner, but from the nearest point to the wrist; it spread very slowly. This was alternately repeated. Allow me to add that it is impossible to gain in sensitiveness by the presence of free nitrate in the above emulsions. —I am, yours, &c., WILLIAM WESTON.

Pendlebury, October 7, 1876.

P.S.—Since writing the foregoing I have found that the second washing to which I have referred was attended with much waste, but sensitiveness was fully restored. It still, however, requires a substratum to prevent frilling, unless the hard water referred to in a recent number of the Journal prove a remedy. I have always used the ordinary tap water, which is extremely soft in this district.—W. W.

SPOTS IN NEGATIVES.

To the EDITORS.

GENTLEMEN,—I was pleased to notice, a few weeks ago, that you took up the subject of those disagreeable round spots sometimes found in negatives taken by the washed emulsion process, more especially as I have been annoyed with them.

Apropos of this, I had occasion to use some plates which had been cleaned and polished about three months ago, and put away in a stock box. On testing them in the usual way, by breathing on them, I was very much surprised to notice a number of precisely similar marks to those which appear when a negative is developed, viz., round holes from the size of a split pea downwards—some sharply defined, others shaded off. They were quite invisible except when the plate was breathed on, and while the moisture was on they appeared transparent, as a spot of grease would. On examining them through a powerful focussing-glass I could distinctly see a very small particle of dust or lint in the centre of each; the larger the mark the larger was the piece of dust in the centre. Having taken notice of the position of each I coated the plate with emulsion, dried, and printed a transparency on it; but on development it came up all right, with no signs of the marks. This I attribute to my having used the plate immediately (about ten minutes after it was coated), as whatever was on the plate would not have sufficient time to injuriously affect the film.

I have invariably noticed that the plates are quite free from the spots referred to if used soon after coating—say, at most, a day or two.

I may mention that the plates were cleaned with tripoli powder and hydrochloric acid, and polished with a linen cloth, there being no substratum whatever.—I am, yours, &c., C. P., JUN.

Manchester, October 10, 1876.

THE PHOTOGRAPHIC EXHIBITION.

To the EDITORS.

GENTLEMEN,—I have read, and re-read, the letter in your last number (October 6th) on the Photographic Exhibition, signed "A Member of Council," and have no hesitation in saying that it is not only in execrably bad taste, but so laboured, stilted, and obscure in style that it may fairly take rank as one of the worst compositions of its class.

Imagine the writer, when such words as "thrown into the waste paper basket" would have answered, using these:—"Which might perhaps be properly relegated to the department ordinarily occupied by complaining letters of disappointed partisans." He then proceeds to make comments such as, he says, "may be most fitly given;" and the seven paragraphs of his letter which follow supply us with the language he considers is *fitly* appropriate for his purpose.

The Council has just reason to be ashamed of the member who can so write, for no words can sufficiently condemn his style, taste, and sentiment. Take, for instance, the fourth paragraph. I know not, nor can it be worth while to inquire, to whom it refers, but "A Member of Council" who writes such a sentence as that in which the words "one special name" occurs is certainly not to be envied. Another sentence in the same paragraph—"If they persist in this course oblivion is surely in store for them"—is striking and singular for its sheer impudence; but for wretched manner, bad style, and want of taste, and as evidence of the total lack of judgment and discretion on the part of the writer, read the sixth paragraph—a paragraph I commend to the attention of both the Council and members of the Society.

I admit that by reason of the ungrammatical construction of the two first sentences of this paragraph the sense is somewhat difficult to reach, for they read thus:—"When the kindly intentions of an amiable man were frustrated by a certain set, who were either perfectly incompetent to judge of the merits of pictures, or else reckless of public opinion, as the decisions were so monstrous as to rouse an indignation rarely seen. Exclusion from power was instant on removing from them the means of self-election." As these words stand they appear to imply that the decisions were excluded from power, and that the decisions had the means of self-election removed from them. Out of this jumble of words, however, the meaning of the writer may be extracted, and I say that his paragraph, and indeed the whole letter, should receive the consideration and judgment of the Council at the very earliest oportunity that is possible.

The final sentence of the letter adds to the impertinence of the words I have already quoted, for the writer says:—"If certain names are absent much longer from photographic catalogues they will be spoken of as 'extinct volcanoes.'"

To this very silly and extremely indiscreet letter I would submit that the simple and effective reply is that the failure of the Exhibition—or, in other words, the absence of the exhibitors referred to—is due alone to the period of the year the Exhibition is held, and not in the slightest way to disloyalty to the Society. I cannot think that there is any foundation for the assertion that those who were in power before the present Council came in purposely absent themselves from meetings and exhibitions. In lieu of long dreary evenings, make the meetings attractive, and members will be sure to attend; hold the exhibition at a reasonable time, and the list of absentees will be materially reduced.

I can answer for myself that, so long as the exhibition is held at the time it now is, it will be out of my power to contribute, even though "oblivion is surely in store for me," and I am spoken of as an "extinct volcano."

The question of holding the Exhibition at its present period is one which will so inevitably be discussed at an early meeting of the Society that I need not now go further into it. It was the letter of "A Member of Council" I desired to make the subject of my own, and to that subject I limit myself.—I am, yours, &c., VERNON HEATH.

43, *Piccadilly, October* 9, 1876.

MR. BOLTON'S LAST FORMULA FOR WASHED EMULSION.

To the EDITORS.

GENTLEMEN,—I always treat any utterances of Mr. Bolton with "distinguished consideration," as the French say, and I have therefore carefully considered his last formula for the preparation of washed emulsion given in his communication published in your last number. I have, however, met with some discrepancies, which I cannot reconcile, between the principles he lays down and the practice he describes.

1. Mr. Bolton says that he now no longer thinks it desirable that the emulsion should contain an excess of silver nitrate during even a portion of the time of its preparation, and yet, after describing his new method of working, he tells us that the set pellicle is to be washed until the wash-water shows no trace, or only the very slightest, of *silver*, conclusively showing that his new emulsion, before pouring out, must have contained *an excess of silver*—the very point which he starts by telling us is to be avoided!

2. In his new formula Mr. Bolton speaks of bromide of cadmium simply. He does not say whether he means anhydrous or crystalline. If the former, taking the combining equivalent at 192, it seems that the quantity of silver nitrate required to combine with the twelve grains of bromide given would be 10·4 grains, and that 5·2 grains more would be necessary for the three grains of ammonium bromide prescribed—together, 15·6 grains of silver nitrate for each six drachms of collodion; while, considering that Mr. Bolton recommends the addition of eighteen grains of silver nitrate would show *an excess* of 2·4 grains in the above quantity of emulsion. This excess would, of course, be still greater if the crystallised bromide of cadmium were meant instead of the anhydrous.

Perhaps Mr. Bolton will kindly explain the apparent discrepancies in his formula, which possibly arise from some misprint.—I am, yours, &c.,

October 9, 1876. W. H. F.

EXCHANGE COLUMN.

A new 12 by 10 Kinnear camera, with late improvements, will be exchanged for a harmonium. Any difference in value adjusted in cash.—Address, BEN., Drogheda.

A first-class dark tent, very portable and compact, containing everything required for use, with ash tripod, will be exchanged for a burnisher, a good *carte* lens, or offers photographic.—Address, W. SLATER, photographer, 84, Jamaica-level, Bermondsey, London.

ANSWERS TO CORRESPONDENTS.

☞ *Correspondents should never write on both sides of the paper.*

PHOTOGRAPHS REGISTERED—

A. E. Lesage, Dublin.—*Twelve Portraits of the Most Rev. Dr. Croke.*

J. White, Salford, Lancashire.—*Two Portraits of Dr. Fraser, Lord Bishop of Manchester, and Three Groups of Dr. Fraser and the Rural Deans of the Diocese.*

ALLEN GARSIDE.—The sketch was returned. There is no charge.

J. H.—After seeing the *cartes* we have merely to refer you to what we said last week.

TYCHO.—It was in 1872 that Mr. Crawshay first offered prizes for the best portraits of a certain class.

S. B. J.—The patent was renewed, and there is still about a year of its duration remaining unexpired.

T. B. SORBY.—The addition of carbonate of soda to acetate of lead, both being in solution, will cause a precipitate.

C. MAGRAVE.—By following the instructions given in our last number by Mr. W. B. Bolton your efforts will be rewarded with success.

CHEMICUS.—Have three apertures made in the sliding front of the camera, and in the centre one fix the lens having the long focus. The focus of the others is not inconveniently long for stereoscopic purposes.

SPES.—While it is quite possible that the graphogenic apparatus may still be manufactured we are not aware of such being the case, nor do we think it is now much, if at all, used. We are not in a position to speak of its merits, never having tried the apparatus.

INQUIRER (Glasgow).—1. Examination was freely permitted.—2. The light was turned out.—3. The colours were so wet that they could be removed by a touch, and they were scarcely dry the following day.—4. The brush we examined was charged with wet paint.

W. MOON.—We most decidedly prefer No. 2 on your list. The form adopted by this maker is the most modern and best approved; besides, he has that intimate acquaintance with the subject that can only be possessed by one who frequently uses the instrument. It will cover fourteen feet quite easily.

REV. F. FOSTER.—For a beginner your pictures are indeed very creditable. Avoid tilting the camera unless it has a swing-back. It is to your having pointed it upwards that the convergence of the sides of the church is due. In posing your portrait subjects adopt occasionally a three-quarter face; this will greatly improve your results. Yes; we have seen the picture to which you allude, and are quite of your opinion that it is about the worst portrait in the exhibition.

T. H. T. (Birmingham).—Nothing can be done to increase the rapidy of your lens unless you are prepared to sacrifice a *little* of the definition. If so, insert a fixed stop between the lenses, the aperture in which stop may be of twice the diameter of the present one. This will cause the lens to work in a fourth of the time now required, but, as we have said, the definition will not be so good as it is at present; for the class of work you mention, this will, however, not matter much. Make a temporary mount of brass, or even of cardboard, and try experimentally how large a diaphragm the lens will bear. After noting the result please write again.

SCRIVENER.—The following retouching varnish has been recommended by some who have tried it:—

Spirits of turpentine	1 ounce.
Canadian balsam	4 drops.

The surface of a previously-varnished negative is moistened with a little of the above, applied with a tuft of cotton-wool, and when dry it is ready for being worked on with a pencil.

JOHN MARTIN.—The handiest way is to dissolve the wax in turpentine, and while it is still warm apply it to the print by means of a brush. Then hold the print before a clear fire to allow the solution to become well absorbed, and again give it a fresh application as before. Pressure between two folds of blotting-paper will effect the removal of the superflous solution, and the print will then be found to be quite transparent enough for your purpose, although possessing a slight degree of granularity.

MEDICUS (Blackheath).—You labour under quite a misapprehension. When we publish, either in abstract or *in extenso*, the specification of a patent we must not for a moment be supposed to endorse the statements made by the patentee; on the contrary, we not unfrequently express positive disapproval of patented inventions. This will enable you to arrive at a more correct decision with respect to the use of bichloride of mercury in toning the transparencies to be finished by Mr. Sarony's patented process for producing photo-mezzotints. The patentee is solely responsible for the formulæ given. For our part we wholly disapprove of the use of mercury as a toning agent for such pictures.

X. Y. Z.—Our correspondent inquires if we have observed a peculiar kind of mealiness or granularity in the texture of a picture by Colonel Stuart Wortley which hangs on the left-hand side as we enter the Photographic Society's exhibition, and, if so, to what we attribute the defect.——We have to say, in reply, that the "defect" or effect, which we *have* observed, may have been caused by one of several things. It might have been printed with a granular mask interposed, although we do not imagine that it was; or the "defect" might have been occasioned by a kind of aquatint grain being imparted to the gelatine (assuming it to be a pigment print) by a process which has already been published; or the granulation may have been effected on the negative. There are several methods by which such effects are produced; and when one has a negative that is hard and patchy, it is better to have recourse to any method of producing softness than, by adhering to unsophistication, to print pictures which would be too strong in their contrasts of light and shade.

FLEXIBLE VIGNETTING MASKS.—Messrs. D. H. Cussons and Co. have forwarded to us specimens of flexible vignetting masks of foreign manufacture. They are composed of a thick, but quite flexible, collodion film. While perfectly transparent in the central portion, they merge into absolute marginal opacity, the centres being of various forms and dimensions. These masks possess undoubted peculiar advantages.

THE BRISTOL AND WEST OF ENGLAND AMATEUR PHOTOGRAPHIC ASSOCIATION.—We are gratified at being able to announce the formation, under the above designation, of a photographic society in Bristol. We trust that it will have a longer lease of life and more uninterrupted prosperity than has fallen to the lot of pre-existing Bristol societies. We recommend all amateurs in the vicinity of the capital of the west to associate themselves with the young society whose birth we now announce. The rules of the Association will shortly be ready, and may be obtained on application to the Honorary Secretary, Mr. Harry A. H. Daniel, 49, Broad-street, Bristol.

PLATINOTYPES.—We are glad to perceive that the beautiful and permanent platinum printing process of Mr. Willis, Jun., has now got beyond the tentative stage, and has become a subject of commercial enterprise. A company, aided by a printing establishment, has been formed to carry out the process practically, and we have now before us several specimens thus produced which we have received from Mr. Skinner, of Brackenbury-road, Hammersmith, indicating the great perfection to which this most useful process has been brought. After the various articles which we have already written respecting the principles and practice of platinum printing we do not here require to add to what we have already said in that respect. The specimens comprise direct and enlarged portraits, together with a fine fruit subject. They are printed on plain paper without any gloss, and are very brilliant.

PHOTOGRAPHY IN COURT.—WARD *v.* PEDROLETTE.—This was an cation brought in the Westminster County Court on Wednesday last, in which the plaintiff, a builder, sued the defendant, a photographer, to recover the sum of £8 for repairs and alterations to defendant's place of business in Augusta-square, Camden Town. The defendant had paid an amount into court. The plaintiff said he had received instructions from the defendant to do some repairs to the large glass-house; but the defendant declined to pay, on the ground that the charges were excessive. Witnesses were called on both sides. The defendant stated the glass-house was not waterproof, in consequence of which his lenses had become rusted and several pictures had been spoiled. The Judge observed that the preponderance of testimony was in the defendant's favour, and, therefore, considered the sum paid into court was sufficient. Judgment would, therefore, be entered for the plaintiff for that amount, but no costs would be allowed.

CONTENTS.

THE BRITISH JOURNAL OF PHOTOGRAPHY.

No. 859. Vol. XXIII.—OCTOBER 20, 1876.

THE ULTIMATE ACTION OF ALKALIES UPON PYROXYLINE.

Following out a line of research suggested to us by the behaviour of emulsions prepared with Mr. Johnston's new silver salt, we have been engaged upon a series of experiments to show the action of alkalies upon pyroxyline in its normal state, and also in solution in the form of collodion. The results obtained tend to confirm us in the opinion we had already formed—that the peculiar behaviour of the emulsions in question is due to the action of the ammonia or other alkali contained in the double salt used in sensitising. We are quite unacquainted with the composition of that salt and of its mode of preparation; and though, as we have stated in a previous article, the emulsion, after sensitising, exhibits traces of free ammonia, we are by no means certain that such a result may not ensue from causes entirely beyond the presence of ammonia in the salt itself, and shall endeavour to show that it may arise from the reactions of other substances which tend to bring about the same ultimate state.

Though many elaborate inquiries have been made from time to time into the nature and composition of the various descriptions of pyroxyline, little or nothing is known of the character of the changes which arise from its decomposition—whether spontaneously or under the action of various re-agents. This is a state of affairs which is scarcely to be wondered at when we take into consideration the delicate and difficult nature of the operations involved in such an inquiry and the dubious amount of practical benefit to be derived therefrom. The only *mémoire* which we can at present call to mind as bearing upon this branch of the question was published by M. Blondeau, upwards of ten years ago; and, though his researches were mainly directed towards an elucidation of the principles governing the explosive properties of gun-cotton, considerable light was thrown upon its composition and general character.

The author starts by recognising several distinct varieties of the substance usually known as pyroxyline or gun-cotton, owing their peculiar characteristics to the varying proportion of nitrogen they contain; these he names "fulminose," "xylodine," "nitric cotton," and "pyroxyline," the last-named being the preparation employed in photography. This substance he found to be capable of entering into combination with various bases in the same manner as an ordinary acid, and was led to view it as a true acid, to which he gave the name of "pyroxylic acid." In combination with potash it forms a pyroxylate of that base, obtained in the state of a yellowish precipitate by the addition of alcoholic solution of potash to ordinary collodion. The pyroxylate of potash is soluble in water, but not in alcohol or ether, and deflagrates at a low temperature, leaving a residue of carbonate of potash. Pyroxylate of ammonia, formed by the action of gaseous ammonia upon pyroxyline, consists of a brown substance slightly soluble in water, alcohol, and ether—a mixture of the two last forming a perfect solvent. A further peculiarity noticed by M. Blondeau is that pyroxyline decomposed by heat gives off successively aqueous vapour and nitric acid, and is eventually carbonised, the residuum containing traces of ammonia, showing that the latter, without any previous addition of alkali in any form, is one of the ultimate results of its decomposition. It is only fair to infer from this that a similar result may ensue, only more slowly from the gradual decomposition of collodion.

Intimately connected with this part of the subject are M. Blondeau's remarks upon pyroxyline in solution. Collodion, he says, is not to be regarded as a simple solution of pyroxyline or pyroxylic acid, but rather of the hydrated acid; for, when precipitated by the addition of water and afterwards carefully dried, it does not exhibit the characteristics of pyroxyline, and shows by analysis that it has taken into combination a considerable quantity of water. We can scarcely follow the author in this argument, as it appears to us that the precipitation *with water* introduces an element which may in itself be sufficient to account for the change in its composition without assuming that the state of hydration is caused by its solution in ether and alcohol. However, we may assume, in the face of the palpable tendency to hydration, that if the solvents contain water the latter will combine with the pyroxyline in the manner described, and practice would certainly lend support to this theory; for it is well known that a considerable quantity of water may be added to collodion without precipitating the cotton, while, at the same time, its structural properties are altered in proportion to the quantity of water added.

In searching for the practical outcome of the above we repeated M. Blondeau's experiments on the formation of pyroxylate of potash and ammonia. The former we were unable to obtain as an insoluble precipitate as described by M. Blondeau, the effect of the potash being to cause gelatinisation of the collodion, which subsequently disappeared, as we have described upon a previous occasion. We varied the method by boiling pyroxyline with solution of potash, which resulted in a gradual discolouration of the cotton, but as far as we could tell there was no evolution of ammonia, as is stated to be the case under such circumstances. The cotton, after washing (during which operation it appeared to lose nothing by solution) and drying was treated with ether and alcohol; but, beyond imparting a brownish tinge to the solvents, it appeared to be unaffected. The pyroxylate of ammonia was prepared by submitting pyroxyline to the action of ammonia vapour for twenty-four hours, during which time it gradually passed through various shades of yellow to a deep brown colour, shrinking considerably in bulk and acquiring a soft, gummy consistency. It was carefully dried and a portion of it treated with water, to which it imparted a strong tinge of its own colour, but whether from actual solution or only by reason of the suspension of finely-divided particles we cannot with any certainty say; we rather believe the latter to be the true state of the case.

A second portion treated with alcohol and ether behaved in a somewhat similar manner, only in this case the colour given to the liquid was certainly owing to the solution of a slight trace of the pyroxylate, the great bulk of which, however, after considerable shaking, remained in suspension in minute feathery tufts, which subsided slowly, leaving a perfectly clear, pale brown solution, which, when poured on to a glass plate and dried, left no appreciable trace of residue. From this it will be seen that no advantage can be expected to accrue from the use of either of the above preparations, though the experiments are interesting as illustrating the effect produced by potash and ammonia upon the constituents of collodion.

In order to try the effect of these two alkalies upon a collodion already sensitised, we took a washed emulsion to which half-a-grain per ounce of bromide of cadmium was added. It was then divided into two parts, to one of which a single drop of a thirty-grain alcoholic solution of potash was added; to the other, one drop of a mixture of three parts of alcohol and one part of strong ammonia. The potash appeared to exercise no visible effect, either physically or photographically—a plate prepared about an hour after adding the potash developing exactly as might have been expected if the potash had been omitted. Not so, however, the portion treated with ammonia; for upon coating a plate there was a change in the appearance of the film, scarcely amounting to structure or coarseness, but yet offering a marked contrast to the bright, clean film of the plain emulsion. Upon development, the result was weak and poor in the extreme, with a strong tendency to fog. The physical character of the emulsion has continued to deteriorate until, at the present time, without further addition of ammonia it is impossible to obtain a respectable film. At the end of twenty-four hours the potash emulsion had undergone no further change, and five drops more of the potash solution were added, with the effect of rendering it considerably thicker. After a few hours, however, it commenced to "thin," and is gradually losing its working powers, the film being weak and rotten, while the deposit of bromide is rapidly gaining in coarseness.

From what we have seen we are forced to the conclusion that the use of alkali in emulsions is injurious, and tends, sooner or later, to decomposition of the collodion. The precise action appears to be to render the cotton insoluble or to decompose it, destroying the power of the collodion to retain the silver bromide in suspension, while the latter conglomerates into coarser particles which entirely destroy the homogeneity of the film.

DEXTRINE, AND ITS USES IN PHOTOGRAPHY.

Considering the immense number of substances which have from time to time been introduced into photographic operations, it is perhaps matter for congratulation that the number actually in use, or found necessary for all the various processes practised at the present time, is comparatively small. That simplicity tends to success will be generally accepted as a truism; and, consequently, it may be taken for granted that, within certain limits, the fewer the articles with which the shelves of the photographic laboratory are encumbered the greater will be the success of the operator, and the more thoroughly will he understand the nature and properties and *capabilities* of each.

It is quite possible, however, to carry the desire for simplicity too far, and to continue the use of a substance for a particular purpose long after something better has been proposed. In addition to this there is amongst photographers—or, at least, those of them who care more for the production of pictures than for experimental work—an imitative and conservative tendency, which leads them to prefer the beaten path and look with something more than doubt on novelties, unless, indeed, they are presented as marketable secrets, in which case they frequently meet with sometimes unmerited favour.

The substance referred to in the heading of this article—dextrine—has long been included in the list of photographic materials, and has been from time to time pressed on the attention of photographers, either as a substitute for something already in use, as offering facilities for variation in ordinary processes, or for the working of processes altogether new. But, while we know that it has been utilised to a certain extent, we are persuaded that a more general acquaintance with its nature and properties would lead to its more general use, not only for the purposes to which it has already been applied, but probably also in other directions.

It is said—but with what truth we do not know—that dextrine owes its introduction to commerce to a fire that occurred at a starch manufactory, when a workman, on inspecting the ruins after the conflagration, found some of the starch that had been for some hours subjected to a high temperature, and, noticing the effect which the water had upon it, saw in the accident a probable source of profit. Experiment soon proved that his observation was correct, and resulted in the establishment of a manufactory of "British gum," the process being for a considerable time guarded as a valuable trade secret. Be that as it may, dextrine is now an important branch of manufacturing trade, and is largely employed in the arts. Unfortunately for photography, however, dextrine is principally valued for its adhesive property, and a low price is more desiderated than purity, the result being that commercial samples vary so much that some yield a stiff paste with fifty per cent. more water than others, some contain much unaltered starch, and sulphuric acid and lime are frequently present—impurities arising from carelessness in manufacture rather than from intentional adulteration.

In the production of the best samples, starch—generally that from the potato—in the dry state is exposed for a number of hours to a temperature of about 150° C., by which it is converted into dextrine —so called because it possesses the property of rotating to the right the plane of polarisation. The empirical formula of starch is $C_6 H_{10} O_5$, and that is also the formula of dextrine, so that the change can hardly be said to be chemical, but may be described as molecular—simply a rearrangement of the atoms; and the conversion is known to be complete when the dextrine ceases to strike the characteristic blue tint when acted on by iodine. The transformation is much more rapidly effected in the presence of nitric, hydrochloric, or sulphuric acid, and we believe that the process now generally adopted is to gelatinise the starch by boiling, then add sulphuric acid, and boil till the transformation is complete; neutralise the acid with carbonate of lime, filter out the insoluble calcium sulphate, and evaporate to dryness. Dextrine so prepared always retains more or less calcium sulphate, and generally also some glucose—a substance into which the whole may readily be converted by prolonged boiling, the dextrine taking up an atom of water and becoming grape sugar, thus—

$$C_6 H_{10} O_5 + H_2 O = C_6 H_{12} O_6.$$

It will be evident, then, that dextrine for photographic purposes should be prepared by dry torrefaction, so as to secure uniformity and freedom from impurity, the neglect of this precaution being, in all probability, the cause of the variation in the results of which operators have frequently complained. A solution of dextrine suitable for photographic purposes should not give a blue colour on the addition of iodine, no precipitate on the addition of oxalate of ammonia, and not redden blue litmus paper.

Such a sample of dextrine once obtained, and a supply ensured, there are, we believe, many purposes to which it might be advantageously applied. As a mountant we think starch is, perhaps, more generally employed than any other substance; but it does not keep well, and might with advantage be superseded by dextrine. The latter dissolves readily even in cold water, and instantly when the water is hot, and with the addition of one drop of carbolic acid to each ounce—or, better still, a few drops of an alcoholic solution of salicylic acid—will keep indefinitely and be always ready for use.

As the organic medium in the reproduction or strengthening of negatives by the "dusting-on" process the value of dextrine is well known, and would, we think, be more appreciated if the precautions here indicated to ensure purity were attended to. It is as a preservative, however, that we think pure dextrine is likely to be most valuable. We are aware that it has been frequently so used, both alone and in conjunction with other substances, but for some reason or other it has not taken a permanent position amongst dry processes—a position to which, judging from what has been done with it, we think it is fairly entitled.

Our readers are, no doubt, aware that the great bulk of the experiments in dry-plate work during the past few years have had for their object the attainment of the best results in the shortest possible time; and yet we doubt whether at the present day there is prepared, either privately or commercially, a plate exceeding, if equalling, in sensitiveness some that were largely used twenty years ago. At that time Mr. Sparling and Mr. McGlashon, of Edinburgh, were working together, and published large numbers of instantaneous street and other views. Many of those were taken on dry plates, the preservative being dextrine or dextrine and albumen. Those plates

were, if our memory be not at fault, developed with iron, and the dextrine preservative contained sufficient silver to form an image of sufficient intensity by the first operation.

Dextrine is insoluble in alcohol, but dissolves in a mixture of that body and water; and, judging from the results of some experiments we have made and are still making, we have reason to believe that such a solution applied to an ordinary emulsion plate, in which there is a trace of bromide in excess, without washing will give a greater degree of rapidity than any of the organifiers in general use.

Altogether we think dextrine is worthy of more attention than it has hitherto received, and are satisfied that if only as much can be accomplished with it now as was done twenty years ago it will soon take the important position to which it is entitled.

THE PHOTOGRAPHIC EXHIBITION.

[Sixth Notice.]

Without delaying at present to explain what is meant by a "cretaceous" photograph, we merely observe that photographs of the cretacean genus have for several years been intimately associated with the name of Mr. William Hanson, of Leeds. This artist exhibits two fine specimens of this class, these being portraits, respectively, of *Mr. Edward Baines* (179) and of the *Right Hon. W. E. Forster, M.P.* (192), which claim attentive examination alike on the dual grounds of the eminence of the subjects and the excellence of the art displayed in their representation. From the purely photographic point of view the portrait of Mr. Foster is, we think, rather entitled to the preference, as it has the appearance of having been subjected to less work in the negative than the companion picture. We are glad also to direct attention to a frame of *carte* portraits (292), by the same artist, placed on one of the screens. It would be difficult to speak too highly of these portraits, either in their artistic or photographic aspect.

During the period which has elapsed since Messrs. Chaffin, of Yeovil, obtained the first prize in one of the Crawshay competitions they have continued to exhibit works of a very high order of artistic merit. Their photographs are of large dimensions, and are taken direct. They have this year confined their exhibits to three pictures, two of them being groups and one a single figure. It need scarcely be said that they are of a character calculated to sustain the high reputation of these artists. *Checkmated* (178) tells its story at the first glance. Three young ladies have been enjoying a game at chess, two of them being more actively employed as combatants, and the third as an interested on-looker. On the face of one lady, who has cast herself back from the table, we see the unmistakable evidence of victory—her expression of conscious superiority in the contest contrasting strongly with the anxious, hopeless expression of the other two, who find themselves in a dilemma without any hope of extrication. In the other picture, *The Trio* (191), we have a group composed of two ladies and a gentleman, who appear to have made a short pause in the course of a musical performance—the instruments being respectively a piano, violin, and violoncello—to listen to certain strictures which are being made by some critic unseen so far as the action portrayed in the picture is concerned. *Kate* (219) is a full length portrait of a lady. It is a picture of great merit, although the reflection from the horizontal bars of the polished article of furniture upon which she leans is rather too strong, and is apt to divert attention from the subject of the portrait. The technical excellence of this and the other two pictures just noticed scarcely leave anything to be desired.

We have, under other circumstances, recently reviewed some of the works of Mr. J. H. C. Harrison, of Paris, and this relieves us of the necessity of here saying little more of those in the Exhibition. We may, however, point out that the collection of views in the Forest of Fontainbleau (262) will be very interesting to English photographers as indicative of the state of carbon printing in France, more especially in its application to landscapes of moderate dimensions. It will be observed that the views of Mr. Harrison, unlike those by English artists, are printed without clouds. We are, of course, well aware that the printing-in of clouds in carbon and in silver pictures differ very materially, for in the latter case the artist can see plainly what he is about and the precise effect produced, whereas in the former a certain system of registration must be adopted; but on this subject we cannot here dilate.

The Old Wreck on Southport Shore (168), by Messrs. B. Wyles and Co., is a work partaking somewhat of the character of Colonel Stuart Wortley's *Desolate*, of which we have previously spoken, inasmuch as both represent stranded and broken-up vessels. In the wrecks (for there are two—that just alluded to, which is a morning view, and an evening view of the same, 204) of Messrs. Wyles and Co. an air of pleasant luminousness is imparted to the morning scene, while that of the evening is more calm and subdued. Both are enriched with clouds true to nature as respects not being too black and heavy; in the evening view the effect is very fine, the moon being seen high up partially veiled by clouds. But of all the pictures exhibited by these artists the finest is undoubtedly that entitled *Below the Miners' Bridge, Bettws-y-Coed* (205). In this view, which is of large dimensions, we have a very attractive subject treated in a masterly manner, the atmospheric effect and gradations of distance being charmingly rendered, and the pictorial effect of the whole enhanced by the judicious introduction of clouds. *Moonlight at Bettws-y-Coed* (251), *Pont-y-Pair* (162), and some "moonlight views" of clouds upon the screen placed near the entrance of the gallery, are all quite up to the usual standard of Messrs. Wyles and Co.

A large portrait of *Professor John Ruskin* (213), "finished in Andrews' new tint," challenges attention. It is by Mr. E. W. Andrews; and, while it is an unmistakable likeness of the great art-critic, there is such a curious facial expression as to lead the spectator to imagine that Mr. Ruskin was enjoying an interview with Turner's ghost. We cannot say that we admire "Andrews new tint," for, as applied to the picture in question, it imparts to it the appearance of an indifferent sepia drawing.

Mr. A. Ford Smith is a most successful representative of composition photography. His *Water Lilies* (163) is one of the gems of the Exhibtion—a term we must apply despite its large dimentions. Three young ladies are seen on the banks of an indent of a stream, one on the one side and two on the other side of the water. Of the latter, one figure is engaged in the act of stooping down to moisten some lilies, which, possibly, may have been plucked from the stream, although there is no ripple apparent to indicate such a recent disturbance of the surface of the water. Her companions are watching her with much interest. The combination of figures, water, and woodland scenery in this picture renders it an admirable production. Scarcely less attractive is Mr. Smith's charming picture *The Reverie* (211), in which a peasant girl is seen in a meditative mood. The background of this picture is full of detail, and yet so retiring and unobtrusive as not to distract the attention for a moment, the principle of subordination being carried out to the fullest extent.

Among the objects on the table is a retouching desk, by Messrs. Burrows and Colton, which differs in at least two respects from any others we have seen, namely, in having an adjustable magnifying-glass fixed a few inches in front of the aperture against which the negative is held by movable clamps, and also in having a concave reflector on the base-board behind that aperture. The object of the latter is to intensify the light upon the negative, on the same principle as in the microscope the light is intensified upon the object by means of the concave mirror of that instrument. These improvements, together with a ground-glass backing, will doubtless be appreciated by all engaged in the art of retouching.

We shall resume our notice next week.

The letter of Dr. Kemp, which appears in our correspondence columns, touches upon an additional objection to the use of the new salt of silver proposed by Mr. Johnston. We purposely omitted mentioning this in our previous remarks, for the reason that in the presence of purely negative evidence as to the advantage to be derived from the new salt we considered it improbable that it would come into general use; but even in the event of its ultimately prov-

ing to be of benefit in emulsion or other processes it is a question whether the dangerous nature of its combinations will not weigh heavily against its adoption. The reactions which take place between the salts of silver and ammonia, more especially, as Dr. Kemp points out, in the presence of ethyl and methyl compounds, are of a very complicated as well as dangerous character, owing, there can be no doubt, to the formation of fulminic acid, and hence the fearfully-explosive substance known as "fulminate of silver." Numerous accidents on a small scale have occurred from the formation of this dangerous substance under conditions where such a result was little to be expected; as, for instance, in evaporating to dryness a bath overcharged with ether and alcohol and rendered alkaline by means of ammonia, the operation has been known to end in an explosion more or less violent according to the exact circumstances which led to the result. Fortunately, in such cases the dangerous compounds are formed in very minute quantities; were it otherwise, the records of photography would, undoubtedly, present a longer list of fatalities than they do at present. In introducing the new salt, however, it appears that we should be raising a spirit which it might at some future time be found difficult to lay; for however harmless the salt may be *per se*, it is at present impossible to say what may be the results of its decomposition in the presence not only of ether and alcohol, but also of gun-cotton. It is easily seen that in sensitising an emulsion with a salt of silver and ammonia all the necessary elements are secured for the formation of the most dangerous of the nitro-compounds, silver ammonia and ethyl or methyl being present simultaneously and in an active state. Certainly the idea of an emulsion containing, in addition to gun-cotton, fulminate of silver or fulminic acid is not calculated to form a pleasant prospect to photographers generally, or to attract more followers to the art.

ON A NEW APPLICATION OF SENSITIVE NEGATIVE TISSUE.

[A communication to the South London Photographic Society.]

The new application I intend to submit to the notice of this Society is a mode of producing combination negatives applicable to almost every class of photographic production. It is based on the special facility the tissue negative possesses to be joined together; but, unlike the system lately described of producing panoramic negatives by joining various sections of the panorama edge to edge, I join them for the purpose face to face, or I superpose two, three, or any number of the images to form the desired combination. It involves the necessity of producing a positive transparency, which is printed again (using the tissue in both instances) and reproduces the negative with all the alterations, additions, or subtractions.

Before I proceed further I will make some observations on the reproduction of the negatives. It is a recognised fact that negatives cannot be reproduced equal to the original by means of the collodion glass plate, wet or dry, either in the camera or by contact printing. The reason of this I attribute to the diffusion of light in the thickness of the glass, which I shall endeavour to explain by means of the following diagram. Here is represented a section of the glass

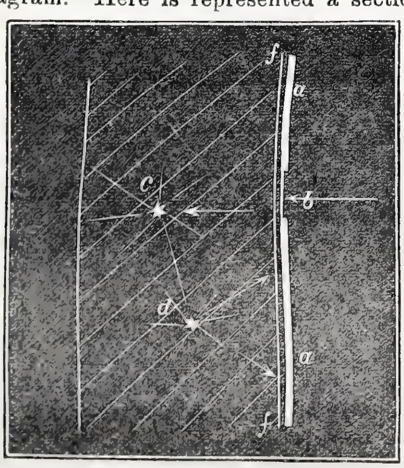


plate covered with sensitive collodion, *f*; *a a* represent an opaque portion of the negative destined to intercept the light, while C is the transparent part. The light acting in the direction of the arrow will affect the sensitive surface situated beneath C; but the sensitive coating *f* not being opaque it will penetrate it, and will illuminate the glass supporting the sensitive film. Reaching the opposite surface it will be partly reflected from it, backwards; and, although this reflection is a highly distorting element, I eliminate it from the present discussion, because it can be prevented by the non-actinic backing of the glass plate.

Before the light reaches the back surface of the glass it will illuminate the multitudinous particles forming the body of the glass. Each of those particles, *c*, becoming luminous will shine in all directions, and will illuminate the neighbouring particles, *d*, which, in their turn, will affect the sensitive surface from the glass side; then the place that was protected by the opaque part *a* from direct light is now exposed to the reflected light, which, although a great deal weaker than the direct light, will, nevertheless, tell its tale, altering undesirably the relation of the gradation of shades. This, according to my idea, is the reason of the impossibility of reproducing the negative correctly on the glass plate.

The sensitive tissue, by its extreme thinness and by the absence of a polished back surface, is free from this defect, and for this reason is admirably suitable for the reproduction of a negative possessing, unaltered, the quality of the original.

In this place I may notice that the magnificent carbon transparencies produced by the Autotype Company for subsequent enlargement owe their recognised superiority over silver transparencies to the very same cause—namely, the carbon tissue on which they are printed, like my own sensitive negative tissue, has no glass support, with its inevitable reflection and diffusion of the light.

Having thus theoretically given the reason of the advantage of using the tissue for the intended purpose, I shall practically demonstrate the advantage gained by the facility with which I can multiply various combination effects, by superposing several films bearing separate portions of the final combination, the thinness of each film being the reason why the combined pictures neither lose in sharpness or transparency.

Beginning thus with a landscape subject: the original negative, as is usually the case, will represent the sky when printed as white paper. A great improvement will be conferred by reproducing this negative with clouds, and this is done in the following manner:—First, the transparency is printed on the tissue, taking care to secure the sky perfectly transparent. Another transparency is produced from the cloud negative, leaving perfectly transparent all the space corresponding with the landscape outline, which is easily done by inserting between the cloud negative and the sensitive tissue a paper mask cut out from the sheet of albumenised sensitive paper, after printing it behind the landscape negative, cutting out with scissors or knife the part representing the sky and blackening it subsequently by light. Two transparencies thus produced will, when superposed, form a new one, which, when printed in contact on a fresh sheet of the sensitive tissue, or copied in the camera, will produce a negative either the same size or diminished or enlarged, which naturally will give a print on paper, or otherwise, equal to the original in quality; but having the sky represented by clouds instead of white paper, and reflecting the artistic feeling of the manipulator displayed in the choice of the suitable cloud subject, and in giving them proper intensity or gradation of intensity.

My next illustration is the application of the same system to a portrait negative. By examining the combination which I now submit for inspection you will observe that it is formed from three films—the first bearing a representation of the ornamental moulded frame of oval shape, with space outside and inside left quite transparent; the second film has the impression of the tinted ground with light white lines and white letterings, representing the name of the subject or artist, &c., with transparent space left for subjects of first and third films. This latter one bears the portrait fitting exactly the frame of the first film, but transparent in other parts. Superposed transparencies are printed as usual. The resulting print will show the advantage of combination, besides the size of the picture gains in magnitude; the small card portrait fills now a 10 × 8 plate without being enlarged. This other portrait shows a different combination, which can be varied without end.

Magic lantern and stereoscopic slides can be also very much improved by the application of the same system. In stereoscopic prints, especially, an important improvement is introduced by adding stereoscopic transparency of the ornamental frame, which, being taken at the much nearer distance than the principal subject, will appear also much nearer to the observer, enhancing by this means the solid aspect to an extent till now unknown. The same method is applicable to the production of combined negatives of line engravings

or drawings, where insertion of the printed or written inscription for subsequent photo-mechanical printing is self-evident.

LEON WARNERKE.

THE PHOTOGRAPHS AT THE SOCIETY'S EXHIBITION.

If an exhibition of photographs is intended to advance the art and practice of making photographic pictures, it seems to me indispensable that the pictures exhibited should be good—*the* best work that each photographer can produce, and not merely a few taken haphazard from a stock on hand, or even selected from general work, taken, in all probability, under trying and hurried conditions. This plan may, and very probably does, represent the quality of the work usually supplied to the public, but is altogether inadequate to fulfil the requirements of an exhibition, where every picture ought to be the best the exhibitors can produce. Even in the case of amateurs, their most successful work should only be exhibited; flooding the walls with merely average or commonplace work is an insult to the judgment of an intensely picture-loving public.

Formerly photographs were exhibited of very high artistic qualities, far above the usual everyday work. What was the result? The annual exhibition was looked forward to as a photographic treat, and the clever and beautiful novelties brought forward never failed in creating more artistic work during the following year. Such hints for improvement were rapidly seized and turned to good account. But, *nous avous changer tout cela,* and the result is a rather insipid jumble of mediocre work, relieved here and there by a few good, cleverly-treated pictures that are unfortunately hung side by side with others of such a different character and poor quality that in attempting to leaven the whole the few are seen to great disadvantage. The preponderance, also, of excessively large work in the shape of reproductions has the drawback of dwarfing smaller direct work by comparison, without any compensating advantage. We all know that photographs can be made both large and sharp without any extraordinary amount of skill—given suitable apparatus; but why on earth we should, year after year, be continually reminded of it in this way I cannot conceive, for it is to be hoped the Photographic Society aspires to be something better than a medium for advertisements. So many large works of this class are objectionable. Photographers do not, artists do not, a discriminating public do not, and, emphatically, those who can appreciate delicate and artistic photography do not, care for this sort of thing; and it is ostensibly for the pleasure and advantage of these that the exhibition is instituted, and, at the same time, to endeavour to advance the art of picture-making amongst photographers, and show the numberless uses to which photography can be applied. If these are not the results aimed at, then the exhibition becomes useless except for advertising purposes.

We all admit only good pictures should be displayed, or those having some unique qualities or exemplifying some new process, or, may be, representing some object of interest to which artistic work in the usual acceptation of the term is inapplicable. These only are the kind of pictures photographers care for. Clever stippling and retouching is not to be despised; but it is not photography, belonging to quite a distinct department of art, and does not in any way represent photography, but is of itself a process that not unfrequently contains all the good qualities of the so-called photographic portrait. The only qualities retouching cannot supply are composition, posing, and grouping; and how few exhibits are there in which these qualities are skilfully shown!

We have arrived at a time when good manipulation is expected as a matter of course, and the particular qualities of a picture to be looked for consist of beauty of form, true linear and aerial perspective, softness, brilliancy, and clever illumination—qualities somewhat outside mere mechanical operations; and the greater or less amount of skill shown marks the photographer as good, bad, or indifferent.

It is not the purpose of this communication to praise or decry any particular works, as there are specimens exhibited as examples of everything to be avoided; while others, again, are charming productions, where difficulties are skilfully tided over and a thoroughly satisfactory result is the consequence. In several instances good negatives are "murdered," the proofs from these being executed in a bungling and inartistic manner, as if the print was the secondary and not the primary consideration. At one time, if a photographer took a good negative, he washed his hands and complacently looked at his negative as a labour completed. Anybody could print it, so little was thought of this part of the process. Now, however, it is recognised as the most important department—a negative producing proofs, good or bad, according to the skill of the printer. Good pictures depend as much upon one part as another of the processes—a failure in any resulting in worthlessness.

I have met photographers given to boast of their work who, when an improvement or slight alteration has been suggested, have replied—"Oh! they will do; it is not worth while printing them again. Besides, people not photographers will not notice the shortcoming; I will alter it if any more are ordered." This, I venture to say, is no very uncommon occurrence, and it is to this kind of feeling that the very medium quality of the pictures exhibited is due. The cost of printing is so trifling, and the difference between a perfect and imperfect proof so great, that I think pictures not coming up to a certain standard of excellence should not be hung. That this is a delicate and difficult matter to decide I am aware; still, until photographers make a practice of rejecting all proofs intended for exhibition that are *not as good as they believe they can produce,* there is little hope of seeing brought together such an instructive gathering of photographs as we have every right to expect.

A NON-EXHIBITOR.

ON THINGS IN GENERAL.

The attractiveness, the defects and the merits of the Photographic Exhibition; the fairness of the hangers and their unfairness, their favouritisms and their antipathies—all have been discounted to such an extent that I should be "a day behind the fair" to come with any criticisms of mine. All the more that if I did praise or dispraise any apparatus or picture there is no certainty that, if anyone one came to examine the objects of my criticism, he would be able to find them, as a spiriting away of a very mundane character has rendered invisible a great number of exhibits which at one time *were* to be seen. This is very unfortunate; I wonder whether the extraordinary spirit painter named in this Journal a week or two ago could not be the means of bringing them into existence again. I never before heard of anyone in England or Scotland with powers like his; though, ten or twelve years ago, results more marvellous still were produced by an American medium. I never saw them, but I have conversed with a gentleman of penetration and great intelligence who did see them.

Revenons à nos moutons—the Exhibition. The usual chorus of cries, from disappointed exhibitors skyed to the utmost, of "uneven-handed justice," "favouritism," &c., &c., rendered harmonious by the dignity of tone and absence from personalities we are now so familiar with on these occasions, have been heard once more, with the usual accompaniment of authoritative utterances from sundry sources. When was there an exhibition when, in addition to letters from a shoal of smaller fry, a "Member of the Council," old and new, did not feel called upon to publish his views upon the subject? There can, however, be no two opinions as to the gross disregard of propriety shown in the utter contempt of rule which the labelling of *some* exhibitors' pictures proves.

We have seen of late several proposals for establishing a central authority—a school or college of photography; but what possible chance at present is there for its realisation in the midst of this red-hot cliqueism now so rampant, which, I suppose, must be? There never was an art or a science but its votaries separated into factions, and saw in each other either a Capulet or a Montagu. I do not really think the Capulets could have been very fond of one another.

I spoke in my last communication of the amount of new things, and also of true things, one finds in the *Daily Telegraph.* They have had something of a very novel nature this time to say about the exhibitors; they miss the *artistic* productions of the well-known names of Glaisher, Stokes, and Spiller. Mr. Stokes has had a little to say about light at one time or another; how delightful it must be to have his services acknowledged in this handsome manner! Probably we may next see their names in connection with a "highly-photographic business," which I noted recently was advertised to be sold. I can imagine very readily a lowly photographic studio; but I confess to a little bewilderment as to the exact meaning of a "highly" photographic one. This English is as sloppy as the practice of the photographers Mr. Russell Sedgfield anathematises so justly. It must, indeed, be a serious drawback to a landscape photographer to follow on the heels of an operator such as he describes, who is, unfortunately, the type of a very large class. It could be only one degree worse than unknowingly following in the wake of one of those scamps who bring disgrace upon the whole profession by taking negatives and receiving pay without the most remote intention of ever sending a print. For sublimity of impudence in that line of roguery, commend me to the rogue who had almost elevated his villainy into a fine art. He, as narrated in

these pages some weeks ago, positively carried but a single glass plate with him!

What would be the fate of a knave like this if caught in Berlin, where, we read, a photographer, Herr Salingré, was fined for merely *exposing* his specimens on a Sunday? After taking his case through two courts to the highest court of appeal, he was fined two thalers, and cast in all the costs, which, if they at all approach those of English courts, would be enough to ruin any but a rich photographer.

We must finally give up all hope of the radiometer, for its own father disowns it in a photographic sense. He has constructed, and described at the British Association meeting, a new form, in which, among other things, he is enabled to observe "the logarithmic decrement of the arc of oscillation when under no influence of radiation," and he finds that as the viscosity measured by the logarithmic decrement "begins to fall off as exhaustion increases," the force of repulsion likewise diminishes instead of increasing! Highly interesting, though disappointing, is it not?

I have not seen any manufacturers respond to the call of "T. P.," who has kindly offered to take charge of a set of experiences and advices, and give his experience on the same. It is a pity the chance should be lost, for it is not every one who would undertake the drudgery of experimenting for the common weal. What he wants is the advice of manufacturers as to what salts to use, and if they will also give him the benefit of their experience he will publish his results. That he is not a mere ordinary unskilled observer is evident from his letter, from which we find that he "has already gone so far as to prepare his own albumenised paper, not using any chemical salt whatever," and his cause of failure he "entirely attributes to the want of these salts."

If there be a being upon whom I look with greater reverence than anything else in creation it is an editor, and to tamper with the majesty of his office would appear to me sheer profanity; yet an uncomfortable feeling is coming over me that it is not beyond the range of possibility that some one is trying to hoax the learned triumvirate that guard and steer the bark of The British Journal of Photography. Mr. J. Johnston has given a description of the most marvellous series of processes it was ever my lot to read of. My first misgiving arose when I saw the formula for collodion to suggest thirty-five grains of pyroxyline to the ounce of solvents. I never saw a pyroxyline that would dissolve to that extent into a solution that would flow. Then we are told to *boil* absolute alcohol in an open dish six inches above the flame of a gas burner. Next, he tells us to pour collodion into the evaporating dish. I will give him the benefit of the doubt, and suppose he meant the light to be taken away first. Next, we are told to add albumen froth to thick collodion, which, before the addition, gives a great amount of structure in the films. A teaspoonful of the froth makes it all right in a fortnight, and then the structure has all vanished! This is a new property of albumen to dissolve in alcohol and ether. Further on we learn that free bromine added to a silver salt causes it to become alkaline; and, finally, we are astounded to be told that so long as the hypo. used contains bromide of silver dissolved in it we may redevelope after fixing, and bring out fresh detail in the shadows. If this communication be not a hoax, it contains some of the greatest discoveries of the century in connection with our art.

However, one must learn in the present day not to be surprised at anything; yet I found it very difficult to restrain a slight amount of astonishment when I read of the new optical discovery, by a Russian photographer, by means of which a common lens can take sharp pictures of a large group under circumstances that would preclude success under ordinary conditions. I was also surprised at the modesty of the inventor's demand—one hundred thousand dollars for a discovery of such value! It is sheer nonsense; he should make it a million! We do not hear what became of the rash man who insulted the discoverer by the offer of five thousand dollars—a paltry thousand pounds! I presume he was given a dose of cyanide on the spot!

I was very glad to notice that Willis's platinum process is likely to come into practical use. The work done by it is of a very high order—infinitely to be preferred to plain salted paper. It possesses vigour, with transparency in the shadows, and a richness more approaching an albumenised print without the objectionable gloss.

What on earth could be the reason that Mr. Tunny, as narrated by Dr. Nicol, did not varnish his negatives? Surely the lot spoken of must have been a set of rejected ones that had escaped destruction and become valuable through unforeseen events. It is difficult to see it otherwise; for, though I have obtained prints from unvarnished negatives, it is a sort of thing to be looked upon rather as a feat, and one cannot imagine all the negatives of a certain period to have been so treated. However, Dr. Nicol's warning to look to your old negatives is a good one.

I have read many ill-advised letters in which zeal has outrun discretion to a very considerable extent; but surely never was so unwise a letter written as one I saw the other day by one of the purchasers of the secret of Mr. Edwards's enlarging process. It appears that some other purchaser must have been false to his vow, for the process in almost the very words of Mr. Edwards has been lately published, but not in a manner to connect it with his name. What does this over-zealous gentleman do but rush into print, and let out of the bag the whole cat the tip of whose tail had been showing, by calling the attention of the photographic world at large to the publication of the process, and pointing out that it contains the whole five pounds' worth, just to cry shame on an unknown individual! I wonder what Mr. Edwards thinks about it!

I also wonder what the Autotype Company think about the method adopted to test their processes in view of the publication under government auspices of all existing Anglo-Saxon charters not in the British Museum. It will be remembered that the Domesday Book was reproduced by photozincography in a very indifferent manner, and, consequently, the Museum authorities adopted the autotype process for the reproductions under their charge. Some clever person, evidently no friend to the above-named company, proposed to test the permanency of autotype prints by boiling them for four hours! The thing is too absurd to be credited; but I have the best authority for the statement, and I believe the government publications will, in consequence, be executed by the photozincographic method highly improved and beautified. Free Lance.

GELATINE EMULSION.

After an experience of six months of my "modified gelatino-bromide process," published in The British Journal of Photography of the 31st March last, I am now in a better position to reply to some of the remarks on the process, which you were kind enough to notice in a very favourable sub-editorial article published in the same Journal.

I find catechu to be an invaluable addition to the gelatine emulsion; it keeps the shadows clear, prevents fog, and thus tends to form bright pictures. For this purpose alone I use it, and not to obtain density, which is supplied by the pyrogallic and gallic acids in conjunction with the silver salt. Catechu might also be used thus, but from one or two experiments I have tried it does not appear desirable to do so. I therefore carefully avoid using it until *all free silver* has been removed, when it only acts as a *clearer*. In my remarks on the process I stated that catechu might also act as a preservative. I formed this opinion principally on its apparent combination with the gelatine (as shown by the retention of colour after much washing), and not merely from the fact of having kept a plate for six weeks, as you were led to suppose by the wording of the last sentence.

From the past six months' experience I have good reason to believe that such combination does take place, as some emulsion made in April last is still in good working condition and quite sweet, notwithstanding the extreme heat of the past summer, and this, too, without the addition of any other preservative whatever. I also find that, although catechu does not coagulate gelatine in mixing, still it is liable to form a coagulum in the emulsion *after* it has been made for a week or two; this, however, has only to be filtered out to render the emulsion as good as before. From one or two trials I am led to hope that a sufficient reduction of the quantity of catechu will entirely remove this defect without impairing its other good qualities.

With reference to the use of pyrogallic and gallic acids in the emulsion, I have never found any reduction of the unconverted nitrate of silver take place on its addition. This may possibly be due (as stated by me in a former communication) to my using the common crystallised nitrate of silver. I am not prepared to say how a neutral salt of silver would be acted on by the same addition. If, as you suggest, the gelatine should prove to act the part of a restrainer we shall be able to take many liberties with the emulsion, and probably with much advantage. I hope, this winter, to be able to put your suggestion to the test, and shall be much pleased if it prove correct.

To those who work with gelatine and are troubled with fog I would suggest the addition of a small portion of catechu to the emulsion, to be added *after all free silver* has been removed by com-

bination and *previous* to washing, and allowing the emulsion to rest an hour or two after its addition. Three drops of a twelve-grain alcoholic tincture of catechu per each ounce of emulsion will, I think, be found to answer the desired end. F. S. K.

NOTES FROM THE NORTH.

Probably most of the readers of The British Journal of Photography have heard of Mr. Diston, of Leven, and many have seen the pictures which have made him somewhat famous, at one or other of the exhibitions held in our own or other countries. Having, during the meeting of the British Association recently held in Glasgow, had an opportunity of somewhat carefully examining a number of examples of Mr. Diston's work, I was so struck both with their artistic excellence and technical perfection that I resolved to take an early opportunity of making his personal acquaintance, and, if possible, getting his permission to inform my readers how his results are brought about.

For the benefit of those who may not have seen the pictures in question I may say that they are what are known as "composition pictures," about 10 × 8 inches in size, and each evidently the result of several negatives, although the price at which they are known to be sold (five shillings per copy) precludes the possibility of each print being subjected to several printings. Then, although from the nature of the subjects it is evident that their several parts have been separately photographed, the most careful examination fails to show a trace of junction lines, nor is there any indication on the surface of the prints of their having been touched out.

The wished-for opportunity having presented itself a few days ago, I, along with two friends whom I had induced to accompany me, found ourselves in the "kingdom of Fife," and at the Leven station of the railway situated in the valley named after the river Leven. Leven is a quiet, sleepy town of some four thousand inhabitants, but there might not be more than forty for all that we saw of them. The only sign of life visible was a somewhat large brick erection, from the chimney-stalk of which smoke was issuing in a half-lazy attempt to convince us that something was really going on, and the only proof that the straggling and irregular, but cleanly-kept, rows of houses were inhabited, lay in the fact that near every door hung a row of very small, gutted, and headless haddocks, brought all the way, no doubt, from Buckhaven; for the Levenites, so far as we could see, had neither boat or line to entrap the swarms of fish that lie at their doors. Of all the villages on the Fife coast, from the "east neuk" to North Queensferry, Leven is from a picturesque point of view perhaps the least interesting, as, though the Forth, in its ever-varying moods, almost washes its foundations, it is tame as an inland town, without a redeeming feature of either landscape or architecture. From all this one would not expect it to be an attractive situation for a resident photographer, and yet, as will be seen as I proceed, there are places with much greater pretensions where the art has not thriven so well.

Mr. Diston lives in a pretty rose-covered cottage, situated in the centre of a well-kept garden, adjacent to the town and near to the railway station. We were received and ushered into a neatly-furnished reception-room by Mrs. Diston, who naturally wished to know if we desired to be photographed. Fortunately for us, as we afterwards learnt, we only wanted an hour's (for him profitless) conversation, and so Mr. Diston almost immediately made his appearance. Had we required his professional assistance we should have been politely asked to call again some other day, as he had not for a day or two been quite well, and preferred to take repose. We found him a simple, genial man, very ready to learn and equally ready to teach, although he seems very much to undervalue his own artistic abilites. On making known our errand we were assured that he would gladly give us all the information he possessed, although he hardly thought he had anything to impart.

We first examined the series of pictures that had been exhibited at Glasgow and had just been returned. Of these, probably the one entitled *Waiting for Change* was the best; and, as a description of it, and the *modus operandi* of its production, will serve as typical of all the others, I shall confine myself to that single picture.

The scene represents the interior of a dairy with the usual furniture and utensils, including the jars and basins from which the current sales are being made. In the centre of the room stands the figure of the dairy-keeper, her left hand holding her dress, and her right hand deep in the recesses of a large pocket, such as are worn by women of her class, vainly trying to pick from amongst the accumulated coppers a stray sixpence or threepenny piece. To the right, and well in front of the woman, stands a little girl, with a pitcher in her right hand, and from the muscle of the arm, and its position of tension generally, it is evident that she has got in it the supply for which she came. Her left hand is raised with outstretched palm, and the whole attitude and expression combined convey most admirably the idea of patient expectancy. Not so the face of the dairy-woman. Mr. Diston has been fortunate in the choice of his models, and in this case nothing could be better than the expression of impatient annoyance at the difficulty experienced in extracting the wished-for small coin. In the background, and to the right of the picture, is a partly-opened door, through which a well-lighted landscape is seen; and, coming towards the door, a small boy, pitcher in hand, gives evidence of another customer, and imparts intensity to the dairy-keeper's expression of annoyance, as the noise of his feet on the gravel walk warns her of his approach.

An examination of this picture showed that it must have been produced by four operations; but on the negative submitted to us we failed to see any indication of how it had been done. There it was as perfect as could be—every figure and shadow just in their proper places, and in such a style that by no conceivable arrangement could they have been photographed as they were; although a little explanation made the matter quite plain, revealing the fact that the operation is simple, but that some experience is necessary for the production of fine results.

The method adopted by Mr. Diston is based on that introduced by Mr. Johnston, of Wick. The first step is, of course, the designing of the picture; and to do this properly it is desirable to make a pencil sketch of the subject, so that the relative positions of the figures may be seen and measured, if necessary, as one by one is placed in position. The picture having been designed and sketched, the interior is arranged or built-up of suitable articles, and the more completely, of course, this is done the better will be the ultimate effect. Mr. Diston's studio stands east and west, is ridge-roofed, with glass on the north ridge and the whole of the north side. It measures 10 × 30 feet. His ordinary portrait work is done at the west end of the studio, while a portion of the east is screened off for the building of interiors. The interior—or "background," as he prefers to call it—is then photographed, fixed, and laid aside, unvarnished; next the figure that is to be nearest the background; then the girl; and lastly the boy. The latter was taken in the open air with suitable surroundings; the other two figures were taken in the studio and with a black background, the object being to get the figure only, the rest of the plate being clear glass. To save one transferring operation it was desirable that one of the figures—that in the finished picture nearest to the point of sight—should be photographed on the plate in the position in which it was to appear, the others in any place, as they were to be transferred. Supposing the figure of the girl with the pitcher to be in proper position and with simply clear glass as a background, it was varnished and was not ready for the next step. The negative of the woman was then soaked in water acidulated with citric acid—although I think sulphuric acid would answer better—and in a short time it was easily floated off. The negative of the girl was next slipped under the detached film and gently raised, taking care that the latter was floated into the required position, and the whole allowed to dry. At this stage we have the figure of the woman apparently behind that of the girl, and yet a portion of her dress covers part of the pitcher and the outstretched arm. To remedy this the covering parts were carefully painted with an aqueous solution of iodine in iodide of potassium until the whole was converted into iodide of silver, which was at once removed by a wash of a weak solution of cyanide of potassium. Any shadow that the front figure would cast on that behind was picked out in the same way—the action of the iodine, of course, not being carried so far as when complete obliteration is required—and the plate was dried and varnished a second time. The background was next treated in the same way and floated into position on the varnished plate, and necessarily covers up both figures. Recourse was again had to the iodine and cyanide, and when the portions of background covering the figures were removed, the part of the operation requiring most care and judgment was then taken in hand. That consisted of the introduction of the necessary shadows, and could not be undertaken without careful study. Not only were shadows required in connection with the figures, but the general effect might be much enhanced by their judicious introduction as cast from various articles of furniture and utensils. Of course they were produced by alternate washes of the iodine and cyanide solutions, and were easily made of any depth—from clear glass to but a shade darker than the highest light. This being satisfactorily accomplished the plate was once more varnished, and the boy and bit of landscape floated into position, and the iodine and cyanide again applied till nothing but the sharply-defined foliage against the sides

of the open door remained; and, lastly, a coat of varnish completed the negative.

In description this process, no doubt, looks somewhat complicated; but we were assured that, after a little practice, it would be found simple and easy. The two principal items which contribute most largely to success are the designing or inventing of such a composition as shall be at once artistic and capable of telling a story—not exhaustively, but to a large extent by suggestion—and the correctly placing and graduating of the shadows on which the beauty of most pictures so much depends. In those two things, more than in the process itself, the success of Mr. Diston undoubtedly lies. He has a cultivated taste and has studied his art as a labour of love, as is evident in his ordinary work, as well as in a large series of landscapes which adorn his reception room; and his influence has not been unfelt on those by whom he is surrounded. On calling attention to a series of portraits in which light and shade were admirably balanced I hinted that, if his *clientèle* were like those of country photographers generally, they would hardly appreciate the fine pictures which he produced; but he assured me that they would not accept the white faces once so popular, and as for retouching, it would not go down at any price. Some time ago he had sent a few negatives to London to be retouched; but in every case they were rejected in favour of untouched specimens, the Levenites very sensibly preferring texture and muscle to enamel and insipidity.

We parted from Mr. Diston highly gratified with our visit, and having some hours to spare resolved to saunter along the coast in search of the picturesque with a view to future days, but nothing worth the journey turned up till we reached Buckhaven. Here there is some really good work to be done. The village consists almost entirely of fishermen's cottages and appliances, and is well worth the attention of all who have a taste for such subjects. The cottages are scattered about with most pleasing irregularity, and the boats and fishing gear can be brought into any variety of desirable foregrounds.

From Buckhaven we made across the country for Cameron-bridge Station, which we reached fully an hour too soon. This was not matter for regret, as it gave us an opportunity of visiting the well-known distillery of that name, where we saw a very pure article running from two Coffy's stills at the rate of eighty thousand gallons per day.

What has photography to do with Cameron-bridge distillery? some of my readers may ask. I answer—A good deal, or, at least, it might have. In formulæ for collodion, either simple or emulsion, absolute alcohol is generally, or at least frequently, recommended. I do not very well know why, as the "spirits of wine" of commerce, if at sixty-two or sixty-four over-proof, answers the purpose perfectly. The commercial spirit, however, is more generally not higher than sixty, and sometimes less, the Excise recognising as low a standard as fifty-four. Now, what we saw produced at Cameron-bridge was running at sixty-six—a strength quite sufficient for all photographic work; and it could be sold for about two shillings and tenpence per gallon and the duty—a very different thing from six shillings per pound, which is about the cost of the so-called absolute alcohol. At present the distiller is not allowed to send out a spirit stronger than twenty-five over-proof, and so he must add water to what we saw run; but I suppose no great difficulty would be found in getting the necessary permission if the spirit should be found suitable for the purpose.

I suppose it is always more or less gratifying to a writer to find his suggestions bearing fruit by being carried into practice; and it will, no doubt, be pleasing to our Editors to hear that at the last meeting of the Edinburgh Photographic Society Mr. Turnbull handed round several really fine negatives on 16×13 plates, and explained that they had been taken with a rapid rectilinear lens intended by the maker to cover only $8\frac{1}{2} \times 6\frac{1}{2}$. The two lenses had been brought closer to each other in the way suggested in an editorial article at page 207 of the present volume, the mount being turned out of a piece of wood, with a saw-cut for the insertion of the stop. Such a mount need only cost a few pence, and will give a photographer who possesses such a lens a power which was altogether unsuspected until the article alluded to was written. JOHN NICOL, Ph.D.

NOCTES WASHINGTONIA.

No. II.

TRICKERY.—HIGHLAND SCENERY.—THE GRAND.—THE SUBLIME.—THE RIDICULOUS.—DRY *versus* WET.—COFFEE AS A DEVELOPER.

LITTLE HARRY: Troth I'm real glad to see ye a' again. I thocht this wad be the last day I should ever see the licht o' day. Eh, what I hae come through!

MAC: One would think by your appearance that you had been murdered downright.

LITTLE HARRY: An' sae I have been, and mair than ance. But I'll tell you all aboot it as soon as I get a wash and a cup o' coffee. [*Exit.*]

MAC: What can be the matter with our little friend? Isn't he somewhat "screwy"?

TOM: It all arose out of a prank that the "Peripatetic" played on him. Last night, after we parted, the three of us went out for a quiet stroll. By-and-by we missed Harry, but in an hour afterwards, "from information received" (as the policemen say), we found him more than half asleep, and not wholly sober in a public house in the Trongate. The "Peripatetic" could not resist the temptation, and so he smeared Harry's nose over with nitrate of silver from a small bottle in his pocket, and followed it up with a pair of moustaches. The creature was that "tight" he thought that the "Peripatetic" was just wiping off some dirt from his face in a kindly way. Well, this morning he got up early to go down the Clyde in the steamer "Iona." I went with him, and had forgotten all about the silver on his nose, but between the light and the air the moustaches and the streak on the nose began to crop out, and by the time we got to Greenock Harry was cutting a queer figure. He being quite unconscious of it, and, maybe, not quite the better of two or three glasses of brandy he had taken to cure his last night's complaint, on the principle of *similia similibus curantur*, said something more plain than pleasant to a lady who had laughed right in and at his face. Her husband gave Harry a shaking, denounced him as a "Cockney puppy," which set his heated Scotch blood on fire. When he eventually discovered what was the matter he gave one of the waiters half-a-crown to try and bleach his face with a carrot poultice. Now, when the mashed carrots were applied to Harry's nose they happened to be heated to boiling point, which made him yell furiously. The little man bore the pain like a hero, believing that the marks would disappear; but I need not say that silver stains do not succumb to carrot poultices. I got him ashore at Rothesay, and by means of iodine and cyanide managed to get his face into presentable form; but I lost my day's pleasure.

MARK OUTE: That did not we. Our small party went to the Trossachs by Dunblane. It rained when we started early in the morning, as it is said always to do in Glasgow.

TOM: Did you see "Jessie, the Flower of Dunblane?"

PER. PHOT.: No, but we saw a noble cathedral, which seemed as if it would make a fine negative; so, while the Callender train was being made up, I had a shot at it with an old but very sensitive tannin plate—one of half-a-dozen of that sort I had with me.

MUNGO: I noticed the view, and intended to have a trial at it also; but before I could get my baths and tent unlimbered I knew that the train would have started; so I left it untried.

MARK OUTE: One scored for dry over wet! But did you not observe what a number and variety of magnificent "bits" were to be had in the neighbourhood of Stirling, especially about the Bridge of Allan?

PER. PHOT.: I noted them well; but scenery of that description can only have justice done to it by the stereoscope, and that, unfortunately, is out of fashion. In like manner, when M'Edin. got into raptures about the fine scene that greeted us when, emerging from the train at Callender and mounting on the Trossachs' coaches, the sun burst forth and dissipated the last remains of moisture and cloudiness, and saw in the sloping mountains and undulating valleys pictures lying ready to be photographed, he overlooked the total impossibility of doing such a thing. Photography seems quite incapable of grappling with scenes like these, which are sublime in their grandeur. What camera exists that could even so much as convey an idea of the dignified repose of those mountain masses which, springing abruptly from earth, tower proudly up into the clouds?

M'EDIN.: Weel! weel! Come doun aff yer stilts and tell us wherein consists the impossibility of photographing sic scenes, which I shall not altogether deny are not quite free from a certain kind o' grandeur and sublimity, although they're sae near Glasgow. Just analyse that or any ither similar kind o' view, and what have you got? Altitude, latitude, and detail. Now, given a good strong side light to bring out the detail and show the various bold projections by the depth of their cast shadows; and given, farther, a camera that has angular power enough to include the mountain from its top to its base, and from its extreme right to its extreme left—and cameras of this kind, you must admit, do exist, although I didna see a panoramic camera amang the traps today—and there's nae impossibility about the matter at all. If you are too near the mountain to get it a' included in your picture, common sense dictates the necessity for planting your camera a little farther from it.

Per. Phot.: My dear M'Edin., I willingly admit that in the way you mention a topographic delineation of a mountain may in a certain way be produced; but, unless under the most exceptional conditions of lighting, and if taken with the aid of a panoramic camera—of which I did not imagine you as a portraitist had any knowledge—a photograph of such a scene would only prove to be a caricature—an out-and-out misrepresentation. But after starting from Callender, and when the second coach halted for a minute, I heard you in loud altercation with a lady sitting opposite to you on the top. What was up?

M'Edin.: O nae muckle; I bore her chatter as lang as I could; but when a scene of unexceptionable magnificence burst on the view, and she simpered and asked me if it wasn't "rather pretty," I couldna' stand it any langer, and asked her what in the deevil's name she meant by applying tae one of the Lords' big mountains the same term she wad apply tae a ribbon or a bonnet in a shop window or tae the dapper little doll in a baby's arms. Gude sake, sirs! how she stared at me at first! but she eventually learnt to employ mair fitting language.

Mark Oute: On our coach we also had some fun. On the heights above the road as we neared Loch Vennachar there is a big boulder which is known as "Sampson's putting-stone." As we passed it the "Peripatetic" tried it on with a soft-headed innocent, who had inquired the origin of the name; and he actually made the fellow believe that it was thrown to this spot by Sampson when he was pulling down the temple of Dagon. It was only when his innocent remark that he wondered how people of the Bradlaugh school could deny such things when they had such a plain proof before their eyes of the supernatural strength of Sampson set the whole coach in a roar that the simpleton began to see that the wicked "Peripatetic" was making game of him.

Little Harry (who had just entered): Weel, I'm muckle the better o' my wash. But whaur are a' your pictures?

Mac.: I have only got two, and they are not quite the thing; the fact is that my silver bath had got so jolted with our coaching and knocking about that it had a tendency to fog a little, so my negatives are not quite what they should be. Bad though they be—and I don't say they're good—I at anyrate have the satisfaction of knowing what I *have* got, and that is more than the "Peripatetic" with his dry plates could either say at the time, or even at the present time.

Per. Phot.: It is the chief beauty of the dry-plate system that one who adopts it is, when out on a tour, entirely freed from the incumbrance and annoyance attendant upon the porterage and erection of a tent and the working with a number of chemical solutions. For some, nay for many, purposes wet collodion is not only advantageous, but is the best process; but for those who, like us, have been scampering over the country on pleasure, and have travelled on railways, coaches, steamboats, and on foot, a dry process offers incalculable advantages. I can't affirm with certainty that I have got a good lot of negatives; but if Mac. will oblige me with a little pyrogallic acid I shall enable you all to judge for yourselves.

Mac.: I use iron only. I have not a particle of pyro.

Per. Phot.: That's very unfortunate. But never mind; I shall not deprive you of the pleasure of seeing the beauty and resources of the dry process. [He rings. Enter Joe.] Joe, will you give my compliments to the hostess, and ask her to make me a cup full of the strongest coffee she has ever made?

Joe: It will be here in two minutes.

Per. Phot.: And I say, Joe, ask the loan of her bottle of smelling-salts for me. [Exit Joe, who speedily returns with the smelling-salts.] Oh! this won't do! This is aromatic vinegar; I must have the old-fashioned ammoniacal salts. If you have not got that, perhaps you have got a little ammonia—hartshorn, you know; or, failing all these, bring me some baking soda. We shan't be beaten. [Exit Joe, who returns with the ammonia and coffee.]

Per. Phot. (resuming): Now, my lads! seeing nothing better can be had, I intend to develope a plate or two with these untoward materials; "any port in a storm," you know. Passing a shop window in Argyle-street, yesterday, I saw some lovely flat-bottomed trays of Japanese manufacture, of which I bought a few very cheap. One of these shall serve as a photographic dish for us tonight. Now, having wet the surface of this plate, I pour over it a little of the strong coffee, to which I have added a few drops of the ammonia, and in a few minutes you will see the details appearing.

Little Harry: Why, I see them coming already. Gude sake, sirs! wha could hae thocht it! I wonder what the art is coming tae wi' all thae new-fangled notions. Dae ye think you could develope it wi' a drap o' Scotch whisky, or brandy, which is a drink muckle mair to my liking?

Mac.: Shut up, you blethering fellow! You are more than half-developed, or rather fixed, with brandy already. But while the development of the image is going on I would inquire of Mungo what he was doing while we were trying to immortalise the Trossachs on our sensitive plates. I missed him for a long time.

Mungo: Well, having no camera, I just got settled into a quiet bed of green, and tried my hand at making a verse or two while you were making your pictures.

Omnes: Let's hear them! let's hear them!

Mungo: Well, you are yourselves responsible for the infliction; so here goes. [Mungo sings.]

Tune—*March of the Cameron Men.*

Through wood, copse, and fell—o'er brake and through dell—
The glintin' o' burnie and glen,
The blue bell and fern—the boulder and cairn—
Fit work for our camera men.
The sun in the vale is gleaming, gleaming,
Each hero keeps working his cell;
I 'mongst the clover lie dreaming, dreaming,
Enjoying myself full as well.

The sun sheds his rays o'er hillocks and braes,
A glimpse of M'Edin. just then
I catch through the trees; some object he sees
That is worthy the camera men.
The sun, &c.

Wi' dry plates and wet they hurry to get
Pictures of lake, hillock, and fen;
I hear the glad sound in the air all around—
The song of the camera men.
The sun, &c.

For nature so green, trimm'd in bright, silv'ry sheen
The song of the foliage-decked glen,
Are gems of delight to the sons of the light—
Fit work for our camera men.
The sun, &c.

And so all the day, half work and half play,
A few minutes' rest now and then;
From the land of the Scot some impressions we've got,
That will live wi' our camera men.
The sun, &c.

Omnes: Thanks! very good, indeed!

Per. Phot.: Well, the first negative is now developed, and I venture to believe you will admit it is quite as good as the generality of landscape negatives.

Little Harry: It is marvellous! What on airth are we comin' tae? A dry plate, and developin' the image wi' coffee and hartshorn! An' a bonny negative it is!—that muckle I'll admit.

Mungo: What is the *rationale* of the application of coffee in this way? I never saw such a thing done before.

Per. Phot.: Before I go into that I will develope a second plate, but with quite another beverage. Joe! kindly procure for me a cup of strong tea.

Little Harry: Lord's sake! I'm fair astonished! Could na' ye try to develope just a single negative wi' a drap o' brandy just tae please a fellow? I'm sure its a far nicer drink than either coffee or tea. [Enter Joe with the tea.]

FOREIGN NOTES AND NEWS.

Awards of the Photographic Jury at Utrecht.—Photography as Used by Engineers.

The awards made in the photographic section of the Exhibition of Arts and Manufactures, held this summer at Utrecht, have just come to hand. The competition was almost confined to the German-speaking races and those allied to them. In the photographic department Holland had only ten representatives; Belgium, one (Dupont, of Brussels); and France, one (P. Kaiser, of Havre), exhibiting burnt-in enamels upon glass and porcelain, though, according to the catalogue, France should have had another representative, the defaulter being Leon Vidal. There were twice as many, if not more, German exhibitors than those of all the other nationalities combined, consequently there is a similar preponderance of German prize-takers.

The photographic jury consisted of five members, namely:—Herr J. C. Schaarwächter, of Berlin; Herr Otto van Bosch, of Frankfort-on-Maine; Herr Theod. Bruggemann, of Amsterdam; Herr H. Gener, of Utrecht; and Herr A. G. Schull, of Bosch. These gentlemen devoted three days to their labours, in the course of

which they awarded to the following exhibitors seven gold, six silver, and four bronze crosses:—

I.—Gold Crosses.

L. Schodisch, of Oberwarth (Hungary), for studies of animals.
Franz Kozmata, of Pesth (Hungary), for children's portraits.
Jean Bapt. Feilner, of Bremen, for portraits.
L. O. Grienwaldt, of Bremen, landscape and architectural studies.
E. Tiedemann, of Bremen, for retouched portraits.
B. Johannes, of Partenkirchen (Bavaria), for mountain scenery.
Brauneck and Maier, of Mayence, for Schnell-press prints.

II.—Silver Crosses.

C. Holzamer, of Worms, for photographs of Luther's monument.
C. F. Schmidt, of Rentlingen, for studies of animals.
Ed. von Delden, of Breslau, for portraits.
A. Kampf, of Aix-le-Chapelle, for portraits.
Dupont, of Brussels, for portraits.
Sommé, Jun., of Breslau, for photographic furniture and *passe-partouts.*

III.—Bronze Crosses.

F. Reinecke, of Hanover, for interiors.
J. G. Hameter, of Dordrecht, for portraits and views.
J. Gœdeljée, of Leyden, for microscopic objects.
Joh. Herzog, of Bremen, for iodised collodion.

The *Photographisches Correspondenz* repeats an anecdote told in *Iron* of the way in which photography enabled some Indian engineers to surmount a difficulty. It lately happened that in British India an enormous block of metal weighing several hundred tons had to be removed from one town to another; but no one knew how it could be done, and advice was sought from England. It was soon seen that mere description would be of no use, so a series of photographs was prepared showing the way in which a large mass of iron is removed from a foundry. One picture showed how the cast is raised by putting planks, first under one side of it, and then under the other; another how rollers are laid under it; a third how the mass is moved forward, and so on. The advantage of such photographs with all the workmen in their places, and handling their tools, will be apparent to all. No description and no drawings could give such a true representation. Here every cord and every roller is seen, and a practised eye can detect where the greatest pressure is.

Another contingency is mentioned in which photographs would be even more useful, namely, when an iron pier has to be placed in the bed of a stream. This is a work of great difficulty, especially when the current is strong at ebb and flow; and photographs showing the arrangements of the crabs and ropes found requisite by experienced professional men are of the greatest value. Indeed, *Iron* maintains that had photography been employed in the construction of the Menai Bridge and other great engineering and architectural works, a saving of thousands of pounds might have been effected.

Meetings of Societies.

SOUTH LONDON PHOTOGRAPHIC SOCIETY.

The first meeting of this Society for the session was held on Thursday, the 12th instant,—the Rev. F. F. Statham, M.A., F.G.S., President, in the chair.

After some preliminary business of a private nature, it was announced that the annual Technical Exhibition of the Society would take place on the evening of Thursday, the 9th November, the annual dinner to be held on the Saturday (November 11th) of the same week.

Mr. Leon Warnerke then made a communication *On a New Application of Sensitive Negative Tissue.* [See page 496.]

The Chairman having spoken of the great importance of the applications mentioned by Mr. Warnerke,

Mr. Jabez Hughes observed that Mr. Warnerke's idea of fogging by the reflection of light from the interior atoms of the glass plate was quite original. That fogging by reflection from the back of the plate does take place was well known to every one who had occasion to photograph a window from the interior of a room; but he thought it was straining a theory rather too far to assume that the light passing through a plate should, ere it reached the back, reverse its course and return to the sensitive film. While Tyndall's theory was correct he had to demur to the present application of it when a plate of transparent glass was used. Then with regard to the uses of pellicles: the late Mr. Scott Archer took all his negatives in that form, and his writings contained directions for removing the negative films from the glass; hence pellicular photography was not quite unknown to them. The removal of films from glass plates was now carried out with great perfection, and he had in his employment a man who could successfully strip off a film from a plate of the dimensions of the large table before them. With regard to the composing of a negative by superposing one pellicle upon another, each containing a subject different from the other, Mr. Johnstone, of Wick, had, some years ago, introduced a system based on that principle; and some well-known *genre* pictures exhibited at the photographic exhibition in London two or three years since, by Mr. Diston, of Leven, had been produced by Johnstone's method. Mr. Hubbard had told him (Mr. Hughes) of the great trouble and time involved in the printing of the picture *Stolen Moments* from a number of negatives; but if he had adopted the system of Johnstone only one printing would have been required, and the picture could have been produced at a cheap rate.

Mr. J. T. Taylor was inclined to take exception to a remark made by the Chairman, in which the latter spoke of the novelty of the suggestion to mount stereoscopic pictures in such a way that the subject should be seen projected beyond the mouut. So far from this being novel it had, some years ago, formed the subject of an article in The British Journal of Photography by one of the members of that Society. With reference to the various kinds of halation a former member, Mr. A. L. Henderson, had at one of their meetings strongly urged the propriety of taking pictures on dark-coloured glass, and transferring the negative thus obtained to plain glass, as an absolute means of preventing halation.

Mr. W. Brooks said he had much experience in the printing of clouds, and he was afraid the method suggested by Mr. Warnerke of combining the clouds with the landscape in one negative would cause the former to print too heavily. He preferred printing-in his clouds by a second operation, which occupied only a mere fraction of a minute.

Mr. F. York adopted the same method for printing clouds as that mentioned by Mr. Brooks. The best cloud effects were obtained from very delicate and thin negatives.

After some other observations,

Mr. Warnerke replied, and combated some of the statements of the previous speakers. In the course of his remarks he said that he was well aware of all that had been done in pellicular photography; all that he meant that evening was to speak of new applications of *sensitive negative tissue.*

A vote of thanks was unanimously passed to Mr. Warnerke, who, while reading his paper, had practically illustrated his various observations.

Mr. J. T. Taylor exhibited specimens of M. Leon Vidal's photopolychromes, after which the meeting was adjourned.

Correspondence.

MR. JOHNSTON'S EMULSION PROCESS.

To the Editors.

Gentlemen,—Immediately after you published Mr. Johnston's emulsion process I felt sufficiently interested in the subject to enter upon its investigation—not, certainly, in the systematic manner you have adopted, but with results fully in accordance with your researches.

Of course I proceeded with caution, as the ammonio-nitrate of silver, in the presence of ethyl and methyl alcohols, is very apt to produce unstable and dangerously-explosive compounds; indeed, if emulsions so formed should prove to claim advantages in the way of rapidity, structureless film, or otherwise, I fear that the danger incurred will more than counterbalance such advantages.

My experiments were made with ethylic alcohol, but the results were similar to those obtained from wood spirit.—I am, yours, &c.,

Barnstaple, October 16, 1876. Geo. Kemp.

P.S.—I enclose an extract from my note-book.—G. K.

§ 700, October 3, 1876.

"A singular reaction was observed with the ammonio-nitrate of silver dissolved in alcohol.

"1. The nitrate was dissolved in alcohol.

"2. A few drops were added of strong solution of ammonia.

"3. Plain collodion was now added, and, when well mixed, bromide of calcium. The whole, when so frequently shaken, formed a smooth emulsion; but the singular fact was elicited that, on adding a few drops of glacial acetic acid, the emulsion gelatinised immediately."

In the course of a few days the whole of the bromide of silver was deposited in a granular form, leaving, as in your report, an almost clear solution. [See *B. J. P.*, p. 481.]

"MR. BOLTON'S LAST FORMULA FOR WASHED EMULSION."

To the Editors.

Gentlemen,—In your last issue appears a letter signed "W. H. F.," in which the writer asks me to explain certain "discrepancies" in my formula, published at page 471, for the preparation of a washed emulsion. According to the writer, it appears that, whereas I "lay down the principle" that it is not "desirable that the emulsion should contain an excess of silver nitrate during even a portion of the time of its pre-

paration," my formula actually shows an excess of nearly two and a-half grains of silver per ounce. As regards the "principle" laid down, my intention was—and I think I expressed myself to that effect—to apply it only to such cases where facility of manipulation and uniformity of result are considered of superior importance to extreme rapidity, and not, as "W. H. F." would seem to infer, to give it out as the best course to adopt under all circumstances.

With regard to the first discrepancy referred to by "W. H. F.," if that gentleman had given as much attention to what immediately preceded the sentence he quotes from my article as he appears to have done to the discovery of its inaccuracies, the context would have shown him that the use of the word "silver" was a most palpable *lapsus calami*, and that "bromide" was meant, for only four or five lines previously I say, "it is doubtful whether the whole of the free bromide *can* be removed," &c., &c. I am indebted to "W. H. F." for the opportunity of correcting an error which had escaped my notice until too late.

The second "discrepancy" is a more serious matter, and had your correspondent been correct in his view of it I should have been compelled to plead guilty to a charge of most culpable carelessness. I have always made it a point, before criticising the statements of others, to assure myself, first of all, that my own views were based upon sound foundation, and, doubtless, this has frequently saved me from "rushing into print" and rendering myself ridiculous. It would have been well had "W. H. F." done likewise in the present instance. It were useless on my part to ask "W. H. F." whose authority he has for taking the combining equivalent of anhydrous bromide of cadmium at 192, as the reply would, probably, not materially alter the correctness of the statement; but I will endeavour to prove to him, theoretically, what a single trial would have rendered apparent, viz., that my formula really does provide an excess of soluble bromide.

I do not know whether "W. H. F." uses old or new notation—a little of each, I should fancy; and I shall demonstrate to him the exact point where his theory runs away with him.

Using the old notation we have the formula Cd Br for cadmium bromide, and taking the combining equivalents—56 and 80 of the metal and halogen respectively—we have a total of 136, representing the equivalent of the salt. But in the new system of notation the equivalent of cadmium is 112, or just double, and the formula for the salt is $Cd\,Br_2$; its new equivalent, therefore, would be 272. "W. H. F.'s" figures are apparently arrived at by adapting the old formula to the new equivalents thus:—$Cd = 112 + Br = 80 = 192$, or a *sub*-bromide of cadmium.

Now, as regards the distinction between crystallised and anhydrous bromide of cadmium, "W. H. F." should be aware that there are an infinity of grades between the two extremes. I thought that sufficient had been written during the last few years to demonstrate the folly of using the crystallised salt unless quite new, owing to its changeable nature. I myself invariably use the *dried* (not anhydrous) salt, prepared by exposing the crystals to a heat of about 200 degrees for three or four hours, in which state nine grains, as nearly as possible, neutralise ten grains of silver, answering closely to the formula $Cd\,Br + 2\,Aq = 154$ (old notation). If "W. H. F." will repeat his calculations, using this equivalent, he will find the formula stands as follows:—

12 grains dried cadmium bromide	=	13·25	grains silver nitrate,
3 ,, ammonium bromide	=	5· 2	,, ,,
or a total quantity of		18·45	,, ,,

to each ounce of emulsion. Thus, instead of an excess of 2·4 grains of silver, as calculated by "W. H. F.," the formula is actually nearly half-a-grain short of full saturation.

Apologising for encroaching so far on your space,—I am, yours, &c.,
Liverpool, October 16, 1876. W. B. Bolton.

THE PHOTOGRAPHIC EXHIBITION.

To the Editors.

Gentlemen,—Will you kindly allow me to offer my apologies to Mr. Vernon Heath for having written anything that might convey the idea that I looked upon him as an "extinct volcano." Nothing could have been farther from my thoughts. I only regret much—what I was already aware of—that the date of the Exhibition has prevented his appearance on its walls.

As to our friends who ventilate their ideas in your contemporary, they are very angry. What a store of cynical quotations and bilious epigrams they have at hand! And in what a ponderous manner is their censure conveyed! But I still live. As the sole object of your contemporary appears to be to divert readers from the true issue, I here restate the case, and with that must leave the matter.

"A Country Photographer" complained, a fortnight ago, of the bad quality of the Exhibition, and gave the names of a number of celebrities who held aloof. He charged the gentlemen who signed the famous requisition with wrecking the Society for selfish ends, oblivious of the fact that the list contained the names of the most eminent and most unselfish men of the Society. I say again, in plain English, that an almost irreparable injury was done to the Society by the distribution of medals and money awards being for years in the hands of a selfish clique, who gave them—partly from incompetency to judge, and partly from unfair dealing—amongst their own friends. At last, as is well known, at the final Crawshay competition the voice of the photographic public broke forth in tones of disgust that could no longer be disregarded. This scandal was stopped, but alas! the Society was mortally stricken, and it will be years before confidence is restored.

To the above may be traced the cause of the falling off, and, when we add to it that the "extinct volcano" party held aloof, in bitterness of vexation, from Society meetings and exhibitions, we have the sum total. No quotation from cynical writers or gall-and-wormwood extracts from poets can alter facts.—I am, yours, &c.,
October 16, 1876. A Member of Council.

To the Editors.

Gentlemen,—Will you kindly allow me a little space in order that I may make an appeal to the exhibitors and members of the Photographic Society?

I have read all the recent correspondence criticising the Exhibition, and I cannot but feel sorry that it is receiving in some quarters such wholesale condemnation. For my own part I think that, from my knowledge of former exhibitions, there is very much to be admired in the present one; and were I to enumerate the names of those exhibitors who deserve praise I should be trespassing too much upon your space. Yet, at the same time, I cannot refrain from specifying the contributions of Mr. Crawshay as being so full of beauty that they alone would repay anyone for a visit to the exhibition. These twenty-five pictures resemble sepia paintings, only they are infinitely more beautiful. They have all been hung almost upon the line, and in close proximity to the cold-toned, exquisite productions of Mr. William Bedford, forming a most pleasing contrast.

Complaints have been made respecting the hanging in general; but, where there was such an *embarras de richesses*, what were the Committee to do? They would like, doubtless, to have put everything upon the line; but, as that was an impossibility, they have done their best. If those who have found fault knew how arduous and fatiguing was the work of a hanging committee they certainly would be inclined to assist those who kindly undertake it, instead of disheartening them by ungracious remarks.

Let me add a few words respecting the early date of the Exhibition. If, as I understand, it be a case of "Hobson's choice," the Gallery being only at liberty during this time, and the Council and Treasurer, with an eye to the finances, consider that it will bring "more grist to the mill" to open the Exhibition for the whole of the period, rather than to shut it up for a part of the time and pay rent for empty rooms, surely, when these considerations are borne in mind, the members should be satisfied and do what they can to ensure its success.

The date was settled at the end of last season, and three months should be sufficient for exhibits to be got ready. Besides, photographers must do other good work in addition to that they especially prepare for the Exhibition. Some have contrived to be ready, therefore others might have done the same. Let each who finds fault with the small number of exhibitors remind himself that his would have added another name to the list. I believe that the "putting off to the morrow what might have been done today" is the real secret of many standing aloof. "Procrastination is the thief of time."

Let me earnestly appeal to all to endeavour to promote, and not retard, the success of the Exhibition; and, as members of the Society, do what they can to further its prosperity. When next season comes round they must, one and all, try to be very good boys indeed, if only to please your correspondent— A Lady.
October 17, 1876.

To the Editors.

Gentlemen,—I wish to correct a statement in your last issue with regard to my pictures in this year's Exhibition. You state that I have gone in "direct contravention of the Council's law" by putting my name on the mount of my pictures. Now as the "rule" states that "no name or any information will be allowed to remain on the *glass* or *frame*," and as my name is on the *mount*, and *not* on the "glass or frame," I fail to see how I have infringed the advertised rules relating to the Exhibition.—I am, yours, &c., H. Garrett Cocking.
57, *Queen's-road, Peckham, October* 16, 1876.

[Is it possible that Mr. Cocking really expects the public to accept the sophism in the above letter? The rule of the Committee was framed to convey, and does convey, a certain definite meaning; and we cannot imagine the Committee ever expected that a quibble would be raised about the phraseology employed in order to cover an evasion of their rule. It is, however, a matter to which *they* must see.—Eds.]

Government and Photozincography.—Some time ago we announced that the preparation of a series of *facsimiles* of Anglo-Saxon charters in the British Museum had been sanctioned by the Trustees. The Government have now, we are glad to be able to add, undertaken to bear the expenses of the publication of *facsimiles* of all the existing

Anglo-Saxon charters that are not in the Museum; and it is proposed to begin with the valuable charters preserved in the cathedral library at Canterbury. The Museum authorities have adopted the autotype process; for the new series the photozincographic has been chosen. This process was somewhat discredited by the unsatisfactory character of the *facsimile* of Domesday, and one or two other publications, in which photozincography was adopted; but, since then, the *modus operandi* has been much improved, and, besides, photozincographs possess the great merit of durability. For the purpose of testing the process with a view to this series of charters, *facsimiles* obtained by photozincography were boiled and kept in hot water for more than four hours, and came out of the ordeal quite uninjured.—*Athenæum.*

PHOTOGRAPHY IN COURT: AN INTERPLEADER ACTION.—At the Clerkenwell County Court, on Wednesday last, the 18th instant, an action was brought by Miss M. E. Harrison to interplead against the High Bailiff, in consequence of the officers of the court seizing the household furniture and effects of her brother-in-law, Joseph M'Arden, trading as Adams and Co., photographers, carrying on business at 329, Barnsbury-road, and at Myddleton Hall, Islington, and over which she held a bill of sale. The plaintiff being called said her name was Miss M. E. Harrison, residing at Liverpool, and she lent her brother-in-law the sum of £150, in various sums, to enable him to carry on his business as a photographer, and also to enable him to take a part of Myddleton Hall for the purpose of extending his business. Having no security she came up to London in April, and executed a bill of sale over all the debtor's goods and plant. These being seized by the bailiffs of the court, the plaintiff at once came to London from Liverpool, and immediately claimed under her bill of sale. Mr. Popham, solicitor, endeavoured to shake the witness's testimony, but without success. Mr. M'Arden said he traded as Adams and Co., and borrowed the amount stated and for the purposes already mentioned. He said that he executed the bill of sale produced in court, and would have repaid the bill of sale had not his photographic business at Myddleton Hall been unsuccessful. Mr. Popham contended that the bill of sale was informal, as the debtor was known by two names, which invalidated that instrument. The Judge did not think so, and considered there never was a clearer case. The plaintiff was entitled to recover all articles enumerated in the bill of sale, and sell them at once if she wished to do so. She had given her evidence in the clearest possible manner, and was entitled to her costs.

EXCHANGE COLUMN.

ANSWERS TO CORRESPONDENTS.

☞ *Correspondents should never write on both sides of the paper.*

O. P. Q.—Certainly not. We can afford to laugh at such pettiness. Thanks, however.

INQUIRER.—A varnish of gum dammar in benzole applied to a negative will give it the required "tooth."

RICHARD EATON.—A cabinet lens, by the same maker, will prove a useful addition. Let it be of eight or nine inches back focus.

J. J. C.—By diluting with ether the negative collodion you are at present using a good positive collodion will be extemporised. About one part of ether to two of collodion will be a suitable degree of attenuation.

W. L. N.—Are you sure that the compound is fluoride of silver? You state too little on which to base a decided opinion; but we have a strong conviction that neither you nor your chemical friends have ever yet been so fortunate as to produce "crystals" of fluoride of silver.

SENOJ.—Until you reduce the power of your top light you will never produce portraits of a higher class than the specimens enclosed. Consult a competent local architect, and see if he cannot devise means for opening out large windows in the sides of your studio.

B. PARKINSON, JUN.—German silver, or nickel silver, is not a *metal*, but a composition, or alloy. Upon handing your letter to a friend who is a manufacturer of this composition he says that the best proportions for nickel silver are sixteen parts of copper, eight parts of nickel, and seven parts of zinc.

A. B. C.—To take Rembrandt portraits in your small studio all that is required is a screen so constructed and arranged as to prevent the direct light from falling upon the sitter in the direction of the arrow in the plan, and removing entirely all blinds and obstructions from the window at the right hand side of the sitter.

CONSTANT READER.—Had you been, as you say you are, a "constant reader," you would have known that we have just completed the publication, in several chapters, of a course of articles on the preparation and colouring of photographic transparencies for the magic lantern. To these articles we refer you.

S. S. (Inverness).—While we shall be very happy to answer any query you may put, we must decline to write for your gratification a course of lessons on the production of photo-relief blocks. We may here state that you will never acquire a practical knowledge of this branch of the art by reading; you must practise what you have thus learned. This also applies to your queries respecting photolithography.

P. FRASER.—The engraving is copyright. It cannot, therefore, be copied without the sanction of the proprietor of the copyright.

G. HARDY.—1. Make a ten- or twelve-grain solution of tannin in common water, and pour about a pint of this into the solution of gelatine, stirring it thoroughly for several minutes. There will be a copious precipitate, which differs essentially from gelatine as respects its solubility in water. Wash the tanno-gelatine thus obtained and preserve it in a bottle.—2. Lignin is neither soluble in alcohol nor water.—3. Hematin is the colouring matter of logwood.

BENJAMIN MIERS.—Any colour or set of colours will answer for painting transparencies for the magic lantern, provided they are transparent. If your old colours possess this peculiarity they will answer very well. The transparency of any pigment can be readily tested by putting a small clot or patch of it upon a glass plate and then looking *through* it at a sheet of white paper, a tube of cardboard or metal being placed down upon the glass plate in such a way as to prevent any light from being *reflected* from the pigment.

SOLAR.—It was an error to throw away the chloride of calcium after it became liquefied. What ought to have been done was to have put the vessel containing it in a warm place until the water it had absorbed had become evaporated. You must adopt this course for the future, otherwise your experiments will be conducted at a much greater cost than there is any necessity for. By heating the pasty mass, and thus driving off the water, the chloride of calcium will have all its original properties restored, and when used as directed it will keep good for years.

REV. P. S.—You have failed to perceive our meaning. We do not find any fault whatever with photo-mezzotints, but only with the application of mercury as a toning agent. We have examples of this class of work which were produced in 1868—the year in which the photo-mezzotint was introduced; and we invite your attention to the following particulars:—Those which were toned by gold, or which were even developed by pyrogallic acid and left without being toned at all, have remained unchanged; while of those that were toned with mercury, in the manner recommended at the time, not one has remained unchanged. Indeed, we long ago recorded the fact that some of these prints faded before they were a year old. But this does not militate against the process as a whole, but only against a certain mode of toning that was by some employed in carrying out the process.

ONE IN DOUBT.—Your friend has not advanced any statement short of the truth in affirming that he can prepare plates which only require washing in water to be rendered sensitive. Although we are not aware of the precise mode by which his plates were prepared, you will be enabled to understand the principle involved in the action from the following:—Light has little, if any, action upon iodide of silver in the presence of chloride of sodium and other haloid salts. If, therefore, a plate be prepared in the usual way, and, after having been thoroughly well washed to remove the nitrate of silver, it be then coated with albumen containing chloride of sodium, such a plate will, after being dried, be quite insensitive. But sensitiveness is imparted by the application of water in such quantity as to effect the total removal of the chloride. This, as we have said, is the principle involved in the action. With regard to the precise way in which your friend carries it into practice we do not offer an opinion.

A.—1. Print in a very weak light (in the shade) so as to secure the greatest possible contrasts between the lights and shades of the picture.—2. The coffee preservative will keep good for several days; but by the addition of a little alcohol the time will be greatly extended. Sugar also aids the keeping properties; but its presence, unless to a very limited extent, is not desirable in the preservative.—3. We have not tried the preservative named for the purpose described, but we imagine it will answer quite well.—4. To our correspondent's fourth query—which is, "Would not crystal varnish (*i.e.*, in which benzole is the solvent) answer for a *substratum* instead of india-rubber or albumen?"—we reply that, provided the body dissolved were insoluble in the collodion and had no injurious action on the silver bath, we see no reason why it should not act as a substratum; but the subject of substrata is one that depends so much upon practical and extended observation and experience that we invite the co-operation of those of our readers who have bestowed some attention on this phase of the subject.

RECEIVED.—R. Faulkner and Co.; *Illustrated Price List of Photographic Apparatus* (Ewing and Co., Toronto). In our next.

METEOROLOGICAL REPORT,

For two Weeks ending October 18, 1876.

Observations taken at 406, Strand, by J. H. STEWARD, Optician.

THESE OBSERVATIONS ARE TAKEN AT 8 A.M.

Oct.	Bar.	Wind.	Wet Bulb.	Dry Bulb.	Max. Tem.	Min. Tem.	Remarks
5	29·89	SW	59	62	71	56	Bright
6	29·88	SE	61	63	72	59	Dull
7	29·91	SW	62	64	68	61	Dull
9	29·56	SW	60	64	66	61	Cloudy
10	29·56	W	56	56	59	55	Raining
11	29·36	SW	56	59	63	54	Cloudy
12	29·71	SW	52	56	67	51	Cloudy
13	29·59	SW	59	61	64	54	Bright
14	29·71	SW	55	57	61	51	Cloudy
16	29·78	SE	51	53	63	46	Foggy
17	29·71	S	57	59	70	51	Dull
18	29·69	E	54	55	—	54	Foggy

CONTENTS.

THE BRITISH JOURNAL OF PHOTOGRAPHY.

No. 860. Vol. XXIII.—OCTOBER 27, 1876.

ON FOG AS AFFECTING SENSITIVENESS.

It is a very well-known fact that the further we advance in the direction of rapidity in photographic operations the greater is the care requisite in carrying out the various manipulations, and the more perfect must be the conditions under which we work. In the production of the most rapid work nothing operates more powerfully in favour of success than the thorough elimination of all fog-inducing tendencies, from whatsoever cause arising. Presuming that the chemicals are of good quality and the solutions in perfect order—as they should be, no matter what class of work may be in hand—we have then but to turn to the conditions under which the manipulations are carried out; and here only too frequently, plain and simple as the circumstances may appear, lies the main obstacle to success.

It has been suggested theoretically, by more than one writer, that sensitiveness as an abstract quality does not really exist; that in fact, no matter how short the exposure may be, there is probably some form of development, as yet undiscovered perhaps, which will bring out a perfect picture. This point we do not wish to discuss here, but it is certain that sensitivess is but a comparative term, dependent in a very great degree upon development and other circumstances. This is easily shown by a brief consideration of the capabilities of different descriptions of plates under the action of various developers. Take, for instance, a wet plate developed with iron, and compare it, as regards the exposure necessary, with a similar plate developed with pyrogallic acid; or, again, test the capabilities of alkaline against acid silver development applied to dry plates. In either case there is sufficient variety in the results to prove that the sensitiveness of any given description of film is not a fixed quantity, but is mainly, if not altogether, dependent upon other conditions.

But we may extend the argument beyond this limit, and venture for a moment or two literally into the regions of "fog." It is quite unnecessary, we should think, to give a diagnosis of the phenomenon bearing the designation of "fog;" suffice it for our purpose to describe it as an abnormal effect, arising from various causes, which makes itself visible simultaneously with the picture under development. When the slightest trace of this defect shows itself it becomes impossible to push the development beyond a certain point; hence we arrive at the necessity for scrupulously guarding against the remotest tendency to the production of this most undesirable effect. There are few of our readers, we should imagine, who have not experienced the difficulty of working up the detail in an under-exposed plate in the presence of this enemy to success; and in point of fact it very frequently happens that the beauty of a picture depends entirely upon the extent to which the development may be pushed without inducing fog. Once present it is next to impossible to secure any additional *detail*, owing to the continual increase of the veil which hides or neutralises the finer portions of the picture.

We might bring numerous illustrations to bear upon the subject, but what we have said will suffice to show our line of argument—that fog-inducing conditions practically exercise a direct action upon the sensitiveness of the plate; it becomes important, therefore, to reduce such conditions to a minimum. Presuming the chemical conditions under which we operate to be perfect, we have not far to seek for a very common producer of fog, namely, the light employed in the preparation and development of the plates. A year or two back attention was called to the necessity of using a more than ordinarily non-actinic light when working with some of the most sensitive descriptions of dry plates, and a very slight experience proved that the recommendation was not without value. It was then stated that the dry plates spoken of required, in order to produce the best results, a more non-actinic light than the quickest wet plates, from which two obvious inferences may be drawn—first, that the dry plates in question were more rapid than wet; or, second, that the bromide of silver forming the dry film, owing to its alleged sensitiveness to a lower point in the spectrum, required greater protection from the action of actinic light than the mixture of iodide and bromide (the former preponderating) which produces the image on a wet plate. How far these inferences are tenable we shall endeavour to show.

Let us take, first of all, the question of comparative sensitiveness. This is easily disposed of, for practice has shown that, for the highest class of extremely rapid work, dry collodion has never yet equalled wet. Turning to the supposed superior sensitiveness of bromide of silver to the less refrangible rays of the spectrum, we can scarcely believe it to be the cause of difference; for, even granting its sensitiveness to the green and a portion of the yellow rays, we can scarcely imagine that a sheet of glass behind which a wet plate capable of producing a picture instantaneously may be exposed with impunity would allow any very active rays to pass, or, at least sufficiently active to account for any great difference in result.

The real necessity for the employment of a denser glass arises, in our opinion, from the difference in the circumstances attending the development in the case of the two descriptions of plates. The wet plate is taken from the camera and developed at once, the operation occupying but a very short time; the dry plate, on the contrary, requires a much longer time to develope, during which it is exposed to the full action of whatever actinic light may pass through the glass. Now allowing, as has been stated, that a certain amount of actinic light passes through even the deepest orange or ruby glass, it may be well understood that the dry plate during its lengthened development would suffer more than the quickly-developed wet plate, and that without its possessing any higher qualities of rapidity or sensitiveness to the rays of lower refrangibility, though the latter might, under the circumstances, contribute somewhat to the result.

The importance of using a sufficiently non-actinic light must be evident, not only in preventing *visible* fog, but in increasing the available sensitiveness of the plate by permitting the development to be carried to a furthur stage than would be possible in the presence of fog. We speak chiefly now of the quality of the light, not its quantity. Too many photographers, in their desire to shut out *actinism*, exclude light also, and work in almost total darkness. Setting on one side the discomfort attending such a course, it cannot be too strongly reprobated, on the ground that it leads to careless working and uncertainty as to the quality of the image under treat-

ment, the result frequently, when too late, proving to be very different from what it appeared to be in the "visible" darkness of the tent or operating-room.

AUTOMATISM APPLIED TO ARTIFICIAL LIGHTING.

Other things being equal, the principle of automatism associated with mechanical or chemical action will secure the amplest recognition in connection with anything to which it is applied. From time to time efforts of a more or less successful character have been made to apply the principle of automatic action to the continuous production of oxygen in the precise ratio of its requirement, and in the past volumes of this Journal will be found the records of such efforts.

The most recent attempt to apply the principle to the generation of oxygen gas for producing the oxyhydrogen or lime light for use in the magic lantern is that of Mr. David Young, of Swinton. This gentleman has during the present year completed certain improvements in connection with apparatus for making oxygen and supplying it, almost immediately it is made, to the oxyhydrogen burner of the magic lantern, a brief account of which cannot fail to prove of interest. We may state that Mr. Young has obtained a patent for his improvements, but we do not this week purpose publishing the details of his invention as given in the specification, reserving them for a future occasion. We shall at present confine ourselves to some observations of a more generally descriptive form than if we published the specification, which enters to so great an extent into the smaller details of the apparatus that, on account of its very completeness, it might prove not a little troublesome to such readers as have not the faculty of readily grasping and understanding a variety of mechanical details.

The threefold object of Mr. Young—and if we are wrong, or in any way misinterpret that gentleman, we shall be glad to be set right—appears to be to so arrange the whole form of the oxygen-generating and burning apparatus as to make it very portable when packed up, to place it under the easy control of the illustrator or demonstrator, and to provide for the generating of oxygen while it is being used.

In giving effect to the first of these the gas bag is discarded, a metallic gas-holder serving the purpose instead. If we interpret Mr. Young's specification aright, the gas-holder consists of two square vessels, one of which is capable of fitting loosely into the other. One has no top and the other has no bottom, hence they may be placed one inside the other in a form very advantageous for providing space in the interior for the storage of other things, such as the lantern itself. When erected for use the same framework which serves as a stand for the lantern serves also as an enclosure for the gas tanks. Ample room is afforded for the elevation of the gas-holder as it gets filled with the oxygen, and one or more weights placed on the top will afford the requisite pressure. No novelty is claimed on the score of the substitution of a gas-holder for a gas bag, but simply for using the holder as a packing-case in the manner here indicated.

The next feature is that which will prove of most interest, consisting as it does of the generating of the oxygen during the progress of the "seance" at which it is being used. A few months ago we described the method by which Mr. Birrell effected this much-desired end, namely, by the self-adjustment of the heat to which the oxygen retort was subjected. In Mr. Young's apparatus a different system is adopted.

It will not have been forgotten by those interested in this subject that at a meeting of the Manchester Photographic Society, held in the early part of 1868, Mr. Noton—whose great ingenuity in this and other matters we cheerfully acknowledge—brought under the notice of his fellow-members a method he had worked out for obtaining, by means of portable apparatus, a supply of oxygen. This method we here describe in outline. It consists in taking six ounces of chlorate of potash and reducing it to powder in a mortar. To this are added two ounces of black oxide of manganese, which is thoroughly mixed with the chlorate of potash. Ten drachms of water are added, and the whole is again thoroughly incorporated. This damp mixture is next formed into solid cylinders or plugs, five-eighths of an inch in diameter and three inches in length, by ramming a sufficient quantity of it into a brass tube of the proper dimensions, afterwards turning it out, to be dried at a temperature not exceeding 212° Fahr. A large number of these plugs should be made at a time, as they keep well and are always ready for use. The way in which they are utilised is by placing one of them in each of four small cast-iron retorts of dimensions permitting them to be received easily, and closed at the end by a screwed cap. These four retorts radiate from a common centre round which they are capable of revolving air-tight, this centre consisting of a tube that communicates with a metallic gas-holder placed below. Each of these retorts may in turn be brought over a Bunsen gas flame, which, by heating the plug inside the retort, causes a liberation of oxygen that passes down into the receiver; and when the supply thus obtained has been nearly exhausted, the retort is moved away by being rotated, and a second one brought into contact with the flame.

We have considered it necessary to describe Mr. Noton's system at some length, as Mr. Young, in his specification, takes for granted that the reader is conversant with the preparation and use of these oxygen plugs; and without this precognition the reader would scarcely be able to understand properly the details of the full specification we intend to publish next week. It will suffice now to state that Mr. Young claims as one of his improvements on Mr. Noton's system the placing of the plug in a separate tube or receptacle previous to enclosing it in the retort, and also the closing of the outer end of the retort in a particular manner.

We have not yet seen Mr. Young's apparatus in action; but we cannot doubt that it will, although not self-acting, conduce much to the gratification of those who have an aversion for gas bags, as well as for the preparation and storing away of a supply of oxygen. The idea of generating oxygen during the time it is being used is one which imparts such a truly comfortable feeling that we are induced to emphatically wish prosperity to every attempt to improve upon existing systems.

DISTILLED *v.* SPRING WATER.

Spring water, as we have often pointed out, is capable in many instances of replacing, without any evil consequences, distilled water in the various formulæ in which the latter is authoritatively pronounced to be necessary. The difference between the two, as we need not point out, merely consists in the matter—organic and inorganic—which is held in solution by spring and river water. With regard to organic matter, it has been held by many that the process of heating for the purpose of distilling so decomposes it that the whole is not left behind—something of a volatile and especially injurious nature being produced and carried over into the condensed product. That this theory is open to question appears evident, and the more so when it is remembered that the tendency of heating any chemical compound is to reduce it to a simpler rather than to a more complex state—the latter being, *a priori*, what one might expect to be most injurious from a photographic point of view.

Our own opinion, as to the evil effects which unquestionably do frequently attend the use of distilled water, is that such effects are owing to adventitious matter entirely unconnected with the originally-dissolved organic matter of the spring water, and most probably introduced through the medium of the still itself. For example: few stills are set apart entirely for the production of pure water, the number of photographers who produce their own distilled water being very limited. The consequence is that the stills which are used one day probably for medicated waters are called into requisition the next for the making of distilled water, which is very unlikely to be entirely free from contaminations with the previous contents. Again: "steam water" from engines is a frequent source of the water obtainable in many neighbourhoods, and it is almost sure to be contaminated with grease or some other impurity.

The ill effects of the former of the two cases were strikingly exemplified in a case within our own ken, not very long ago. A gallon of new bath had been made by a photographer of great experience with whom we are acquainted, and the very first plate taken in it

fogged completely upon the application of the developer. The water having been procured for years from the same source it was not suspected, and it was some time before it was discovered to be the cause of the mischief. The chemist from whom it was obtained had, immediately before distilling it, been distilling some seeds containing large quantities of essential oil; the water supplied to our photographic friend consequently contained minute quantities of a reducing agent of most mischievous power.

The question, therefore, arises—"Will not spring water answer as well as distilled?" and practice gives the answer—"In many cases." Let us take the common cases—the negative and the printing baths. Our own experience goes to show that, unless the water be of an unusually-impure character, no danger need be feared from using it, and the only other point to be considered is the possible loss of silver. The few grains that are thrown down ought to be recovered in great part among the residues; and even if it were not it would be more than counterbalanced by the extra cost that distilled water would entail if it had been used. For the printing bath the use of water producing a precipitate of carbonate is a positive advantage, carbonate of silver being now so commonly made use of for keeping this bath in good working order. It will, of course, be understood that, in addition to the slight loss of silver through precipitation, there will be introduced a corresponding amount of nitrates of lime, magnesia, &c., into the bath. But experience shows that in neither bath do these salts—at any rate, in these minute proportions—produce any ill effect; neither for the negative bath does the organic matter, as we have stated.

There is, however, no question that if ill were to be apprehended the organic matter would be its source, and we are, therefore, met with the inquiry—"Cannot it be eliminated by any process besides evaporation and condensation, that is, 'distillation'"? As an answer we propose to give a brief *résumé* of some remarkable experiments in this direction made by Professor Wanklyn, and recently published.

Starting with the well-known action exercised by platinum black in promoting the union of oxygen with gases and vapours, he experimented upon the facility with which dissolved oxygen and dissolved organic matter combined when passed through a silicated carbon filter. He checked off his results by his well-known method of analysing water for organic impurity. He found that those porous filters which are made of a peculiar form of charcoal in combination with some silica and a little iron exercised a most marked action in withdrawing organic matter in solution, contrary to the usually-received notion that only suspended matter was removed by their aid.

He then entered into a series of special experiments with various salts with results that could hardly have been anticipated. He dissolved sulphate of quinine in the proportion of about eight and a-half grains to the gallon, and, after passing it through the filter, the whole of this quantity was extracted or destroyed, the issuing fluid having no bitter taste whatever! Next he dissolved hydrochlorate of morphia in about the same proportions, passed it through the same filter, and again the salt was removed, no trace whatever being shown when tested by the Nessler solution. These were two very extraordinary results, showing that the mere passing of the solutions through the filter should have just the same effect as boiling with caustic potash and permanganate of potash. Wishing to put the filter to a still more crucial test, he prepared a solution of sixty-three grains to a gallon with the object of discovering whether the filter lost its power by burning up, as it were, the materials within its texture. The result was that $\frac{29}{30}$ths of the whole quantity were destroyed.

The most remarkable and sensational result he last published was the behaviour of the filter with strychnine. He made a pretty strong solution, passed it through, and then taking 300 c.c. (about ten ounces) which originally contained ·126 gramme per litre—enough to poison several people—he drank off the whole quantity without experiencing any ill effect whatever.

These results were too remarkable to pass by. We intend, when we have leisure, to test for photographic purposes alone various waters passed through one of these filters, and our readers shall be put in possession of the results of our experiments.

THE PHOTOGRAPHIC EXHIBITION.

[Seventh Notice.]

There are on the table, in addition to the excellent retouching-desk of Messrs. Burrows and Colton, a very fine collection of magic-lantern transparencies, by Mr. F. York. These comprise photographic views taken in the British and South Kensington Museums, in the Holy Land, and in Egypt. They are all of the highest class, being noticeable for the purity of the whites and the perfection of the detail.

Messrs. W. H. Oakley and Co. contribute (also to be found on the table) a case containing various pieces of photographic apparatus, such as a plate-box with plates, print-trimmers, shapes and glass-cutters, spirit-levels, and magic-lantern slides. Mr. F. Beasley contributes a cabinet stereoscope fitted with transparencies mostly of Indian scenery; and Mr. George Hare exhibits a portable camera and automatic changing-box. In addition to the foregoing the Autotype Company—whose other contributions we shall notice next week—exhibit a beautifully-illustrated volume of pictures of *Norwich Cathedral*. These, with a portfolio of views of *Relics of Old London*, by Messrs. A. and J. Bool, and No. I. of the *Royal Academy Album*, sent by the Fine-Art Publishing Company, comprise the exhibits on the table.

We must not omit to mention that Messrs. Murray and Heath have an attractive stand fitted with stereoscopes and choice transparencies.

Of a scenograph exhibited by the Sciopticon Company we shall soon have occasion to speak at some length, as we purpose devoting an article to a description of certain mechanical details of this instrument.

A large collection of stereoscopic pictures (302) is contributed by Mr. F. H. Worsley Bennison. They form a series illustrative of botanical subjects. We are more pleased with these than with any similar pictures we have seen, they are so exceedingly instructive. The subjects are well selected and skilfully photographed. We should be glad to see pictures of this class attaining a wide-spread popularity. Several duplicates of the series are lying upon the table in a form convenient for proper inspection.

A noticeable feature in a large collection of portraits by Messrs. W. and A. H. Fry, of Brighton, is the predominance of the backgrounds. We have no fault whatever to find with the subjects of these backgrounds—on the contrary, they are excellent; but they force the attention of the spectator away from the figures, and speaking in the interests of the living forms represented by these portrait subjects—some of whom, by the way, are so scantily clothed as to perhaps offend the proprieties of the present day—we think such distraction of the attention an injustice. The whole of the exhibits of these artists are charming, *only* "they are backgrounded over much," as we once heard an American critic observe in connection with other productions.

Only one picture (259) is contributed by Mr. Reuben Mitchell—a view in the Island of Skye; and, although the subject is replete with sterility, the picture is very fine.

A number of views and groups, by Mr. W. J. A. Grant, entitled *Bits in Russian Lapland* (228), possess great interest. Here are brought under our immediate introspection a number of scenes and types of the human form with which, were it not for the aid thus rendered by our art-science, we might never have had the opportunity of making acquaintance.

Mr. H. G. Cocking exhibits three pictures, one of which, a portrait of *Miss Walker* (208), possesses such qualities as to warrant us in saying that, artistically, it is the finest portrait by Mr. Cocking we have ever seen. *Harriet* (159), by the same artist, is also a charming portrait, the face being, pictorially, very soft and delicate. His *genre* picture, *What'll Missus Say?* (215), tells its tale very effectually. A domestic "help," either by accident or carelessness, has broken a pitcher, and, holding its remains in her hand, her first thought is that which finds expression in the title of the picture.

So short a period has elapsed since we described the attractive *Academy Portraits* of Mr. Warwick Brookes that we need merely direct attention to the fact of their being in the Exhibition. They are to be seen on the screen at the south end of the room.

As examples of good commercial photography of the genus *carte* a large collection by Mr. W. Protheroe (295) may be cited. They evince great care in their production. The same may be said of a frame of portraits of children by Mr. J. A. Vesey, and the contributions of Mr. A. Oeffelein.

There are two attractive pictures exhibited by Mr. W. Gillard. *Haymaking* (206) is a singularly fine full-length portrait of a lady represented as being engaged in the rural avocation from which the picture derives its title. In the companion picture, *The Gleaner* (224), the effect is a little marred by the strength of the white clouds, which are apt to withdraw attention from the pleasing countenance of the young lady gleaner.

SINCE writing last upon the subject of the proposed new emulsion process, we have continued our experiments, but only with results confirmatory of our previously-expressed opinions. We spoke in a former article of our intention of trying the ammonio-silver salt in connection with a washed emulsion, in the hope of securing any beneficial action without allowing time for the deleterious effects produced upon the collodion to become evident. An emulsion was accordingly prepared in a similar manner, and using the same formula as previously described, only that ten hours after sensitising it was poured out to "set," washed, dried, and redissolved in the usual manner. In behaviour during preparation, and appearance when completed, there was nothing to distinguish the resulting emulsion from one prepared in the ordinary manner—that is to say, using silver nitrate in place of the compound salt—unless we mention the unusual richness of its colour by transmitted light. This we have found throughout our various experiments to be the prevailing characteristic of the new salt; and we were led to hope that, if means were found to overcome its "rotting" action upon the film, great results might possibly ensue. We place considerable faith in the test of colour as applied to an emulsion; but in this case—at least so far as we have gone—our faith has been misplaced, for the result was in no way an improvement upon what had gone before. The pellicle, when redissolved, formed an emulsion which to all appearances was faultless, and when poured upon a plate formed a film which set quickly and evenly with no apparent signs of structure or mottling, though exhibiting a slightly "dead" surface, as if caused by the presence of an excess of water in the solvents. As soon, however, as the film is dried it presents the same appearance we have mentioned before of finely-reticulated markings, though not in this case extending uniformly over the whole surface, but distributed in bands or lines with intervening spaces free from structure and equal in character to the best films we have seen. That this effect is not caused by any peculiarity in drying we are fully satisfied; for it occurs equally whether the plate be dried by artificial heat or spontaneously—whether exposed to the action of chance currents of air or enclosed in a proper drying-box. There appears to be no room to doubt that the effect of the ammonia set free by the decomposition of the silver is to at once set up a disintegrating action upon the collodion, which requires some special treatment to overcome. A most obvious means of nullifying this action appears to be to acidify the collodion previous to the addition of the silver, but then we fail to see the probable advantage conferred by the presence of the ammonia. We noticed a peculiar result in connection with one of the first emulsions we made with the new salt: having become very thin from the action of the silver salt upon the cotton we added more of the latter in order to give it greater body. At the expiration of about twenty-four hours the improvement was so great that we ventured to add a further quantity, but this time with the result of de-emulsifying the mixture altogether. It now remains perfectly clear and nearly colourless, with the whole of the bromide deposited; while from its fluidity it might be supposed to contain two, or perhaps three, grains of pyroxyline to each ounce.

EFFECTUAL WASHING OF PRINTS.

SIMPLE as are many of the processes of pigment printing, and brilliantly beautiful as are the results when those processes are properly wrought, there is as yet but little appearance of silver printing being superseded to any great extent—so far, at least, as small pictures are concerned—and, therefore, anything that may tend to lessen suspicion as to the permanency of silver prints, or that may in any degree reduce the numbers that do actually fade, cannot fail to interest my readers.

No one who will take the trouble to look over these pages, for say the past twenty years, can fail to be struck with the large amount of attention that the subject of print-washing has received, or to admire the ingenuity which has been displayed in the construction of machines intended either to lessen manual labour or to do the work more efficiently than it can be done by hand; nor can such a student be altogether free from the thought that he must be a bold writer who, in view of all that has been written on the subject, hopes to say anything either interesting or new. But the question of stating or leaving unstated anything in connection with such a subject depends, not so much on what has been already advanced, as on the effects which thereby have been produced—not so much, in fact, on whether all that is necessary to know has already been published, as on whether such publication has resulted in every manipulator adopting the best method of doing the work most efficiently.

Is this the case in the not unimportant question of print-washing? As a result of a somewhat extensive experience amongst both professional and amateur photographers I am constrained to reply in the negative, and to say that while in some houses, from a mistaken idea of the actual nature of the changes sought to be brought about, the hyposulphites are but imperfectly removed, in the great majority of cases the prints are subjected to an amount of washing not only absurdly in excess of what is required to remove every trace of the fixing salts, but sufficient to seriously injure what it was meant to protect.

Assuming that the ultimate object of the ordinary photographer is the production of a brilliant, beautiful, and perfect paper print, it is simply a truism to say that, no matter how perfect in every respect his negative may be, it is little better than labour lost if, from rapid fading, lack of *juicy* brilliancy, or degradation of tone and delicate detail, the print be not up to the desired standard. Now, the outcry against fading has been so loud and so extensively uttered, and the fact that sulphur compounds are inimical to permanence is so fully admitted, that the desire to ensure total removal of the much-abused hyposulphites has left operators only half alive to the other causes of deterioration; and, in order to make sure that the enemy is really expelled, prints are frequently left from twelve to twenty-four hours in water. Even where the washing water is comparatively pure the disintegrating influence of such lengthened exposure is injurious to both paper and albumen; and when, as is more generally the case, it contains calcium chloride and sulphate, and sometimes ferruginous salts, many of the best qualities of the prints are destroyed, and that to such an extent that one might be excused for wishing that sufficient hypo. had been retained to ensure the rapid disappearance of what was neither a "beauty" or a "joy." In addition to this I am persuaded, also, that in too many cases the mind of the photographer has been so engrossed with the determination to get rid of the hyposulphites that other probable causes of fading have been overlooked, and have no doubt that it has been condemned for many a fault that on more careful examination might have been traced to other causes.

It is no doubt true that writers whose experience has embraced both theory and practice have again and again proclaimed in these pages that prolonged washing was not required for the removal of the fixing salt, and really injured the prints; but such a warning must be both loud and long before it reaches the ears of some for whom it is intended, and therefore it is that I yet again, somewhat earnestly, direct attention to the subject.

A sheet of albumenised paper of medium thickness, after being removed from the fixing bath and drained, is found to have absorbed about seven drachms of the liquid, which may be roughly estimated to contain one hundred grains of the hyposulphite. This salt, as is well known, is very soluble in water, and so, if the sheet be suspended in say five pints, diffusion immediately begins, the liquid in contact with the paper, in consequence of superior density, sinking to the bottom of the vessel. In a very short time, especially if gently moved, the one hundred grains will be diffused through the whole one hundred ounces of water; and if the sheet be removed and again drained it will only contain only one grain of the hyposulphite. Suspended in another five pints of water—that is, a second change—and drained, it will only remove $\frac{1}{100}$th of a grain. A third change reduces it to $\frac{1}{10000}$th, and a fourth to $\frac{1}{1000000}$th, beyond which we need not follow it, but remain content in the assurance that, theo-

retically at least, a *carte* properly washed in four changes of water should not retain more than $\frac{1}{32000000}$th of a grain—a quantity so small as to elude the ken of even the most enthusiastic homœopathist.

I am aware that in practice such a rapid diminution of the hyposulphite does not really take place; but, as the result of experiments made on rather an extensive scale with the simple arrangement about to be described, it may be taken for granted there is no doubt any ordinary number of prints may in the space of an hour, and without a touch of manual labour, be so thoroughly washed that the most delicate tests with which we are acquainted show no trace of sulphur or any of its salts.

The apparatus consists of a trough three feet long, fifteen inches wide, and twelve inches deep, with a hole in the bottom communicating with the soil-pipe—in fact, an ordinary sink. What I used was made of slate, but any other material would do; probably wood lined with pitch would be as cheap and suitable as anything else. Have a number of rods made of soft wood, three-eighths of an inch in diameter, and just long enough to admit of being joined across the trough immediately below the level of the water. To these rods the prints are fastened by black pins at two of the corners, and they are placed at such a distance apart that the prints on one rod, floating just under the surface, are clear of those on the other. In this way the trough holds eight rods, each carrying five *cartes*—forty in all—or other sizes in proportion. The water is supplied by a coil of three-eighths composition tube perforated throughout its length with very small holes, connected by a rubber tube with the tap, and suspended over the prints. As soon as the trough is filled with water the prints float immediately under the surface. The dense hyposulphite solution falls to the bottom and is the first to escape. This process goes on continuously, and in less than an hour, as found to be the result of numerous experiments, I feel satisfied that neither the iodine and starch test for hyposulphite of soda or the sulphuretted hydrogen and lead reaction for sulphur will indicate a trace of either of these bodies.

No doubt objection may be taken to the small number of prints that can be washed at one time in a trough of the size mentioned; but it must be remembered that rapid and perfect washing implies the necessity for each print being kept separate, and that four hundred may be washed in one trough in a day of ten hours.

John Nicol, Ph.D.

ON THE ACTION OF ALCOHOL ON CARBON TISSUE.

If, after exposing pigmented tissue to the light, it be immersed in alcohol and left to dry before it is developed, it will be observed that the picture will have greater intensity with half the exposure than it would have if treated in the ordinary way. Hence we are able to shorten the exposure materially if we immerse it in alcohol previous to developing. This action of the alcohol is not confined to imparting sensitiveness, for it also produces on the layer of gelatine a very fine granulation, plainly seen in the half-tints.

By immersing the gelatine in alcohol, whether it be for a short or long time, it prevents it from absorbing water to any great extent. The network is found to be closed, and in the development it preserves every detail in the negative. Again: the treatment with alcohol before developing frees the tissue of a large proportion of bichromate, and enables us, after exposure, to keep the tissue for several days without undergoing alteration; at any rate, it now keeps much longer than if the process had been conducted in the usual manner. These facts may not be of much importance in our ordinary practice, but it is a valuable fact to be known, because all detailed remarks add to the intimate knowledge of the various actions produced on bichromated gelatine, either before or after development.

Alcohol has, no doubt, the power of displacing all the water in the network of the layers of gelatine and making it closer, and gives more solidity to the surface on which is to be imprinted the luminous rays, and it enables us to correct the faults of certain gelatines which have a tendency to give insufficient density.

I submit these observations to the attention of my brethren in the hope that they will aid in the investigation of this matter.

—*La Moniteur de la Photographie.* Leon Vidal.

NOCTES WASHINGTONIA.

No. III.

Theory *versus* Practice.—High Rate of Insurance for Studios.—Fire Annihilators.—The Fall of Inversnaid.—Pop-gun Cameras and Dry Plates.

Mac.: Our friend Harry is the type of a number of photographers of the lowest school, who fabricate into food, and fatten on, the drippings from the scientist's table.

Little Harry: Then I'm the type o' the men o' action and the men o' sense. But dinna imagine that we fatten on the men o' thocht, for it's nae sic thing. It's nae that easy tae fatten on anything noo-a-days. But what or whaur wad be the theorist without the man o' practice? Like an architect without a builder, like an editor without a printer, or like a fireman without his engine. An' this puts me in mind that there is a great fire ragin' in a'maist the next street, which again causes me to suggest that the way that puir photographers are treated, in some places, by the fire insurance folks is a fair shame. They stick it on to us as if we had millions tae fling awa', as if every photographer had a pipe in his mouth frae mornin' till nicht, and had his floors strewed wi' gunpoother that communicated wi' magazines placed roond the walls.

Mark Oute: It is certainly a great grievance that photographers should be charged higher premiums than is the case in other businesses and professions in which there is equal, if not greater, risk. But this is not all; for such a bad notoriety attends a photographic studio that its very presence in a block of buildings not unfrequently raises the premium upon the whole of them.

Mac.: I wonder that a system adopted by a cousin of mine does not find more favour. He has a large business and occupies very extensive premises. He insured against fire very heavily for many years, but about five years ago, when the rate of premium was increased to an unbearable extent, he decided upon discontinuing the practice. But he is a man that is very wise in his generation, and so, taking advantage of a few well-known facts in science, he has his premises so secured against fire that if one were to break out its extinction would prove a very facile matter. He has a tin case charged with a mixture of chlorate of potash, sugar, and ferrocyanide of potassium, and on the top of this he has a bottle of sulphuric acid. Now, if a fire were to break out, all he has to do is to pull a string, whereby the bottle would be broken and the acid allowed to mix with the other materials, when, instantly, there is generated a gas that is so inimical to fire as to put it out instantly.

Per. Phot.: I don't think that this possesses any advantages over another system I have seen in use—nay, I don't think it is quite so good. In this latter a vessel is filled with water and sulphuric acid, and when it is wanted for use a canister of whiting is emptied into it, the lid being immediately closed. The generation of carbonic acid is so rapid and so powerful as to cause the liquid to be ejected with enormous violence through a leaden pipe that dips down to the bottom, and is passed up through an aperture in the lid, terminating in a stop-cock and nozzle. To test its efficacy in case of a fire, I was present when a lot of straw, shavings, and broken boxes which had been saturated with old collodion, pitch, rosin, and petroleum were ignited in a garden tool-house. When the fire was at its height the nozzle was directed towards it and the tap turned. The effect was very surprising. I have never seen anything that more impressed me with the power that man may exercise over such a furious force in nature as fire. In less than one minute from the turning of the tap, so as to permit of the escape of the gas-charged water, the flames were completely extinguished. Now, by the aid of appliances of this kind photographers may be quite independent of fire insurance companies—most assuredly of those who conceive it their duty to inflict upon our fraternity a burthen heavier than they choose to bear.

Harry: Could not the thing be made self-acting, so as to be started into vitality during the nicht, and when naebody was aboot? Ye ken that fires commonly happen late at nicht, when the maist o' folks are asleep.

Tom: Troth there's some sense in the noddle of the little man after all, "tight" though he be! His suggestion is very good.

Per. Phot.: So practical is the suggestion that it has already been acted upon, and the manner in which I saw it carried out was very ingenious. Near the ceiling of the collodion and stock room there is a wooden tank nearly filled with lumps of chalk and whiting. Over this is a hinged flap or shelf, upon which stands a jar, filled with common sulphuric acid of the most ordinary kind, and the arrangement is such that if a bolt be drawn the whole of the contents of the bottle will be emptied into the tank containing the whiting. This bolt is kept under the influence of an electro-magnet, which is controlled by any one of three metallic thermometers which are placed in the three principal rooms. If a fire were to break out the temperature of the room would immediately rise. But this increase of the temperature, acting upon the thermometer, would cause the battery circuit to be completed, when, with the quickness of thought, the electro-magnet would draw the bolt, and thus cause such an evolution of carbonic acid as would thoroughly extinguish the fire in its earliest stage. But all this time we have quite overlooked the fact that there is a plate lying in the dish, and being developed by the action of the tea infusion. Let us examine it.

M'Edin.: Why, as sure as I live, that's the waterfall of Inversnaid! How on earth did you get it after the mishap ye met with?

Mungo: Had he a mishap? We never heard of it before.

M'Edin.: Ye see that Mark and the "Peripatetic" coached it over frae Stronachlachar, whaur the Loch Katrine wee steamer, Rob Roy, lands the passengers frae the Trossachs. Weel, as I wanted tae hae a quiet look at Loch Arklet, and as the distance between Loch Katrine and Loch Lomond through the pass o' Inversnaid is only a matter o' some four or five miles, I preferred to join a batch o' the tourists wha were walking, especially as the road being sae steep coaching is a very slow process. Talk o' yer Swiss lakes and scenery! Faugh! I question if there be a mair lovely sight in the hail creation than the view you get o' Loch Lomond when, as you get through that neck-breaking, zig-zag pass at Inversnaid, the sheet o' water pent up by purple mountains, fringed wi' valleys an' hamlets, and gemmed wi' the islands like bits o' moss scattered ower the surface o' a looking-glass, bursts richt upon your gaze! Ech, sirs, but it *is* graund! Weel, having just had a toothfu' an' a bite, tae stave off hunger till dinner was ready, I sauntered aboot, wending my way to the cascade adjoining. Wha' should I see but Mark an' the "Peripatetic" blazing away aboon the falls wi' their bit pop-gun o' a camera. I hid amang the trees to watch them for a while. Mark was munching sandwiches, and the "Peripatetic" was exposing plate after plate as if the place was to be swallowed up by an earthquake after that day, an' it behove him to perpetuate the remembrance o' every stane and bush. I watched the pair o' them creeping down by the side o' the fall, and, getting perched upon a rock, the "Peripatetic" planted his camera to do a front view o' the fall. The rock, maybe, was slippery, but, anyhow, the next sight I saw was the "Peripatetic" going heels over head making for the bottom o' the burn, and the camera keeping him company in his descent. How he escaped frae drooning and having his skull staved in is a wonder tae me. He has to thank an old trunk o' a tree that he is here wi' us tonight. Thinking he was killed, I rushed off to where he was by a roundabout kind o' road, and, wad ye believe it? there was the fellow wi' his camera again planted and blazing away at the cascade as if naething had happened, and when I came up to him he had the cheek tae try and gar me believe that he had come doon that way purposely. It appears tae me that sic pop-guns o' cameras and dry plates mak' folk tempt Providence needlessly.

Per. Phot.: Well, but at least you will admit that I have obtained a good negative of that view; and, although you seem inclined not to esteem very highly my camera, if you have a foot-rule about you it will be found that this negative is eight inches by five inches in dimensions, and that, I think, is a good size for any purpose you like. But, as it is now near midnight, we must adjourn till tomorrow night, by which time I shall have obtained the proper materials for developing the remainder of my plates. [They adjourn.]

POOR NEGATIVES: THEIR CAUSE AND CURE.

First-rate negatives are not always to be had—at least such has been my own experience; and when I hear a man say that *he* never fails I make up my mind that his judgment is not sound upon the negative question.

The difference between a good operator and a poor operator can be stated in a few words. A good operator *sometimes* makes a poor negative, and a poor operator *sometimes* makes a good one, though in either case the negative is very apt to get rubbed out, simply for the same reason—that is, non-appreciation. Unavoidable circumstances are liable to occur which may leave even the most careful operator with a miserable negative on his hands from which an order must be filled or lost.

Every operator, probably, has his own plan of procedure in these emergencies; but I presume there are many to whom a few hints in regard to my treatment of such cases would be acceptable.

I always keep my negative bath at about forty grains to the ounce and slightly acid. I boil it once in a great while, but sun it often, and add plain silver and water, when necessary, to bring it up to quantity and strength. I never meddle with my bath when the blacks come clear on a clean glass, which it seldom fails to do with a suitable collodion. Some operators are eternally at war with their negative bath, and it is always bound to fight back.

"Iron-clad negatives" (hard, harsh contrasts of black and white) are generally attributable to peculiar properties in the collodion, although many other causes sometimes produce these abominations. When I get caught with such a sample of collodion, and nothing better at hand, I try some of the following remedies:—

1. Hold the plate level and still while the developer is on.
2. Increase the time of exposure.
3. Increase the quantity of alcohol, and reduce the acid in the developer.
4. Add iron to the developer.
5. Combine all the foregoing remedies, and then, if the negatives be still hard, add about one-half grain of bromide of cadmium or ammonium to each ounce of collodion; shake till dissolved, filter, or, when settled, try again. This treatment will generally produce the desired result.

But there may be no time to make changes, and we find in our hands a hard, opaque negative, with no chance of getting a better one. In that case develope for detail (unless you calculate upon the retoucher building up the shadows; in that case stop the development as soon as the lights are sufficiently intense). Wash and fix as usual; then, after washing *thoroughly*, flow the plate with alcohol, pouring on and off until the water is all driven out of the film; then varnish with flint or any shellac varnish. When the varnish is dry, if it look flat or dead, warm the plate and varnish again.

"Flat negatives" may be caused by—1. Too long exposure in the camera. 2. Too little contrast of light and shade in the model. 3. Too much alcohol in the developer. 4. Too little iodine in the collodion. 5. Too much bromine in the collodion. 6. Too little iodide in the bath. 7. Too much iron in the developer. 8. Too much acid in the bath.

When I say too much or too little of a thing I mean that the proportions of the various compounds do not harmonise, and no time should be lost in ferreting out the cause and applying the proper remedy. In the meantime, if you find yourself obliged to put up with a flat, lifeless negative, try the following plan:—

Rock the plate to keep the developer in motion, and when the light parts of the impression cease to acquire strength wash and fix the negative; then wash *thoroughly* under the tap, after which the desired intensity can be generally obtained by strengthening with pyrogallic and silver, or with a fresh solution of sulphuret of potassium, poured on and off, or laid flat in a dish and covered with the solution (the strength of the solution matters little, but when only little additional intensity is required a weak solution is safer); *when very much intensity is necessary the plate should be warmed with the solution upon it.* If the negative have been thoroughly washed there will be no danger of staining it, even after the same has been previously strengthened with pyrogallic; but if on looking through the negative at the light any stains should appear the application of the sulphuret should be continued until they disappear.

"Weak" or "under-timed negatives" should be strengthened by redeveloping with iron and silver over and over again, until all the detail appears which it is possible to obtain; then wash, fix, and, after the final washing, dry, and varnish with *thin* varnish, which dries almost flat—that is, without gloss—and adds opacity to the film.

Varnished Negatives.

It sometimes happens that a negative dries flat, although it appeared all right when wet; and on trial we find that it yields flat, miserable prints in spite of all the "dodges" of the printer and retoucher if the negative have not been subjected to the *full action* of the sulphuret.

Lay the negative, face up, in a flat dish, and flood it with alcohol. Cover the dish with a pane of glass, or something which will retard evaporation, and let it remain until the varnish is dissolved; then rinse with fresh alcohol, after which wash under the tap again, and then flow the plate with a strong solution of sulphuret, warming it if necessary, and generally you will find the negative will gain sufficient strength. Finally: wash, dry, and varnish as in the first place. The same alcohol will do for subsequent use for the same purpose, and for thinning varnish when too thick.

Finally: it will be observed that the main points in regard to strengthening negatives may be summed up as follow:—

Hard negatives lack detail, but show strong contrasts.

Flat negatives are full of detail, but lack contrast.

Weak or under-timed negatives lack detail in the shadows, and strength in the lights.

Redeveloping with silver and iron, *before fixing*, increases the strength and brings up detail. Pyrogallic and silver do the same, with rather less effect upon the shadows.

Strengthening or intensifying, *after fixing*, adds strength to what is already developed, but brings out no additional detail.

I hope what I have endeavoured to explain may be of some use to somebody, and that others may give us their experience upon this subject. E. Z. Webster.

—*Photo. Mosaics.*

PHOTOGRAPHIC PORTRAITURE.

Chapter III.—Some Lessons from Sir Thomas Lawrence.

Portraiture had assumed a much higher position as a branch of art when Thomas Lawrence emerged from obscurity and rose to fill the position previously occupied by Sir Joshua Reynolds. The latter, by his unaided efforts, had developed the public taste for works far superior to those which had been popular when he was a student in the painting-room of Mr. Thomas Hudson; and rivals of the greatest ability had sprang up around him towards the close of his career whose works were destined to shine beside his own, precious as gems in the art-galleries of succeeding generations. The nobler qualities of portraiture, which give its productions value as works of art, were then commonly understood and generally recognised amongst art patrons, and Thomas Lawrence had to work up to a much higher standard of public taste than that which had inspired the efforts of his predecessors.

Lawrence was a splendid draughtsman, and this power of depicting easily had much to do with his special excellences as a portrait painter. It enabled him not only to ensure likeness by the accuracy of his delineations, but to catch those intellectual varieties of expressions and those fleeting graces of subtle movements for which his works are so remarkable. And herein the photographic art-student may find this great teacher's first lesson; for you may be quite sure that the higher excellences can only be based upon the lower—that he who finds all his efforts are required to meet the mere technical and mechanical difficulties of his art will have neither thought nor energy left for straining after greater and nobler conquests. Your quickness of perception and taste for the beautiful can avail you little, however refined and cultivated they may be, if you lack the means of expressing what you perceive and feel. Phases of thought or emotion live in sudden movements which come and go with singular rapidity, and he who would catch them must watch for them keenly, with a mind freed from all anxiety about the chemical, optical, or manipulatory details of his work. As Sir Thomas sat down to his easel, confident in his power to express, and eager in thought and quick of eye to perceive what he ought to express, so should the photographer enter his studio; and this he can never do until he has thoroughly mastered that section of his art which is to him what drawing was to Sir Thomas Lawrence.

Again: the full influence of passing thought and feeling, when expressed on the face, often finds, forcibly, definition in muscular movements only to be detected in subtle changes of the most delicate half-tones. A coming smile will quiver in the veriest ghost of a dimple on the cheek of beauty, and give the quietest face that charming appearance of actual life and motion to be sought and found in no other source. To catch such expressions as that represents demands the perfect modelling which a painter calls a branch of drawing, and the photographer owes to his knowledge of lighting, exposing, and developing. It would obviously be vain to seek such rare effects for canvas or negative if the power of depicting them were not present; therefore the student of art-photography may learn from Sir Thomas as his first lesson that of mastering the lower before proceeding to tackle the higher and more difficult excellences of his art.

Henry Howard, R.A., in his *Lectures on Painting*, published by Bohn, in 1848, says:—

"Lawrence may be said to have extended, varied, and invigorated the treatment of *chiaroscuro*, and to have wielded it in all its different modes and characters with uncommon power. His peculiar brilliance arises from the vivid opposition and broad masses of his lights and darks, and the particular intensity which he contrives to give them * * His whites were like snow, and his darks deeper than black; and these were often brought into the fiercest collision, as if with the endeavour to rival light itself and dazzle the eye of the spectator."

Whether this be legitimate or not is a question which has been warmly discussed; but no one has yet doubted the unusual splendour of the effects so produced. The power he thus acquired is undoubtedly found in the works of Sir Thomas Lawrence, where it serves to extend the sphere of art and augment its powers of expression or realisation to a wonderful extent, and in a way which constitutes a great lesson in *chiaroscuro* well worth the closest study on the part of all aspiring photographers. Apply that power in any way you please, modify it to whatever extent you may think desirable, but if you can possibly acquire it by all means do so. With this end in view *good* prints from the paintings of Lawrence will be of real service; but let them be good, for his works were largely engraved, and often in a way by no means fairly representative of the great originals.

In going for lessons to the works of great masters it is wise to remember that being human they were not faultless, and that like them in that respect are their works. As a matter of taste it is now pretty well known that a fully-pronounced, well-developed smile upon the face of a portrait is not desirable, and in too many of the female portraits of Lawrence that smile meets us. Unchanging, suggesting nothing to come or to follow, the constant sight thereof is soon found to be unpleasant; and although the smiles depicted by Sir Thomas are neither the affected simpers nor the broad grins we frequently see in photographs, but delightfully natural and unforced, yet they are distinctly and completely smiles which suggest neither coming nor going, and consequently lack the great charm which goes so far in giving animation, thought, and feeling to what otherwise is a dead, flat, inert surface, painted or chemically coloured in imitation of outer forms in their most empty and uninteresting condition. C. R. Leslie, the late Royal Academician, said of Lawrence:—

"His wish to please the sitter made him yield more than his English predecessors had done to the foolish desire of most people to be painted with a smile; though he was far from extending this indulgence to the extreme of a self-satisfied simper that the French painters of the age preceding his had introduced to a portrait."

Speaking of Leslie, by-the-bye, reminds me that he was one of the few artists who regarded photography with deep respect as an art as yet but imperfectly appreciated in its picture-producing powers. In his *Hand-Book for Young Painters* he says of photography:—"Its improvements have followed each other so rapidly that we cannot but expect many more, and are quite in the dark as to what may be its next wonder." And with special reference to the photographic portraiture of his day—it has been great in its more recent advances—he added:—"In its present state it confirms what has always been felt by the best artists and the best critics, that *facsimile* is not that species of resemblance to nature, even in a portrait, that is most agreeable"—meaning, no doubt, that species of *facsimile* which is true to the forms of things but ignores that life and soul which finds expression in subtle changes of muscular action and fleeting lights and shadows. But this is a digression; let us return to Sir Thomas.

Amongst the prints I recommend to your attention that of the famous actress, Miss Farren, who was afterwards Countess of Derby, may be specially noticed for the ease and grace of its pose. It was Lawrence's first exhibited painting. Note also the majesty he infused into the portrait of another great actress, Mrs. Siddons—the air of intense thought and intellectual power which he stamped upon statesmen—the solemn calm of his bishop portraits—and the qualities he invariably expressed in accordance with the age, profession, or personal character of the sitter. All these may serve as lessons to the young and inquiring photographic student, showing him the highest phases of portraiture in the hands of a great master. There is a portrait of Miss Croker which has always been described as one of his best works, which is pregnant with useful hints and suggestions. Allan Cunningham says that when this picture was exhibited at the Royal Academy, in the May of 1827, "men stood before it in a half circle admiring its loveliness." Another portrait almost as famous is that of the Countess of Wilton, and for manly character that of J. W. Croker is admirable. *Master Lambton*, a child's portrait, is a type of high excellence, delightfully fresh and natural in both expression and pose. The boy reclines on a rock in an attitude of careless ease, looking skyward with an expression of intense wonder in the eyes, which lets us into a little world of child thought and feeling.

Haydon, whose contempt for portraiture was the result of a blind, unthinking prejudice, and whose idea of high art was big canvasses, wrote thus of Sir Thomas:—

"Lawrence is dead—to portrait painting a great loss. Certainly there is no man left who thinks it worth his while, if he were able, to devote his powers to the elevation of commonplace faces. He was suited to the age—the age to him. He flattered its vanities, pampered its weaknesses, and met its meretricious tastes. His men are all gentlemen, with an air of fashion, and the dandyism of high life; his women beautiful, but not natural. They appear to look that they may be looked at, and to languish for the sake of sympathy. As an artist he will not rank high in the opinion of posterity. He was not ignorant of the figure, but he drew with great incorrectness, because he drew it to suit the fashion of the season. He had no eye for colour. His tint was opaque, his cheeks were rougéd, his lips were the lips of a lay figure, his bloom was the bloom of a perfumer. Of composition he scarcely knew anything; and, perhaps, in the whole circle of art there never was a more lamentable proof of these deficiencies than in his last portrait of the king. After his visit to Italy the improvement which took place was an honour to his talents; his latter pictures are by far the best. His great excellence was in expression, both in figure and feature. He did not keep his sitters inanimate and lifeless; but by interesting their

feelings he brought out the expression which was excited by the pleasure they felt."

Harsh and extravagant as Haydon's criticism is I give it here in order that you may look at the works of Lawrence fairly and dispassionately; and, while studying their beauties, not to be led away by admiration of them to confound them or associate them with their faults. A. H. Wall.

FOREIGN NOTES AND NEWS.

A New Carbon Tissue.—A Flexible Support for Negatives.—A New and Important Discovery!

The only subject of general interest discussed at the last meeting of the Photographic Society of Frankfurt was a new carbon tissue, a number of prints upon which were shown by Dr. Schleussner, who at the same time remarked that the new tissue was superior to the English make, as it could be rolled up without cracking, and was very soft to use. According to the manufacturer the following is a categorical list of its seven points of superiority:—

1. A greater solidity of the picture film both during the manipulation and in the dry condition.
2. Clearer lights combined with perfectly-transparent shadows.
3. A quicker and more equal drying after sensitising.
4. It does not require such anxious watching while soaking in water, as it may suck up a little more water without injury.
5. It is cheaper.
6. The pictures to be mounted are thinner.
7. The film is less soluble at a temperature above 40° C.

Several of the gentlemen present took specimens of the tissue with them, promising to report the results obtained.

A short time ago, as mentioned in these notes, Herr Jandaurek, in speculating upon the reasons why the carbon process has been heartily adopted by comparatively so few photographers, came to the conclusion that the troublesomeness of the double transfer was the main preventive cause; at the same time he suggested that this obstacle might be overcome by taking reversed negatives in the camera. To that proposal there is a rejoinder, by Herr Geldmacher, of Frankfurt, in this month's *Correspondenz*. Herr Geldmacher does not deny, what is evident, namely, that the introduction of a process by which an unreversed positive print could be obtained by single transfer would do much to popularise carbon printing; but to the plan of taking the negatives reversed—that is, with the glass side of the *cliché* next the sitter—he objects, stating that the negatives would be useless if silver prints or carbon enamels, which can only be produced by double transfer, were wished. His idea is that the best plan would be to get negatives which could be printed from either side. This could be done by removing the picture film from the glass by means of a layer of gelatine; but this plan he rejects as too troublesome and, at the same time, too risky. For some time back he has bestowed a good deal of attention upon the subject, and has been experimenting with a view to preparing negatives upon an elastic film thin enough to allow of the picture being printed from either side, and which shall be easily removed from the glass. This discovery he hopes shortly to publish, with full details; meantime, he assures us it will be found quicker and simpler than the silver process, and that the saving effected by the economy of time will be sufficient to cover the increased cost of production.

Herr Geldmacher has already applied the carbon process, but presumably by the ordinary single or double transfer, to the ornamentation of various articles made of an immense variety of materials, amongst which are ivory, enamel, porcelain, marble, mother-of-pearl, horn, wood, silk, satin, leather, india-rubber, wax-cloth, metals, &c. His carbon prints in gold and silver pigments, in imitation of antique vases, were exhibited and much admired at a meeting of the Photographic Society of Frankfurt; but, though quite unique in their way, they will certainly be thrown into the shade by the result of his later labours, should the flexible support turn out to be a really practicable idea, as there is no doubt that, to a very great extent, Herren Jandaurek and Geldmacher are right in attributing the unwillingness of photographers to throw aside the process with which they are familiar to the greater cost, difficulty, and consequent uncertainty of the double transfer.

A curious instance of the impudent way in which well-known remedies are palmed off upon an unsuspecting public is related by Herr Fritz Haugk in a recent number of the *Photographischen Wochenblatt*. A certain Herr S. recently announced, by circular, to the photographic public that, as the result of long-continued experiments, he had discovered a sure preventive against the blistering of albumenised paper, and that this medium might also be used with great advantage even to paper which was not apt to blister, as it prevented the tone of the pictures from being the least altered in the hyposulphite of soda, having the property of preserving them exactly as when taken out of the gold toning bath. Herr S. has offered his specific, with directions for use, at two shillings per kilo., and the formula for preparing the same for five shillings.

Immediately on receipt of the circular Herr Haugk bought half a kilogramme of the specific, and a cursory examination led him to conjecture that he had in his hands neither more nor less than a simple solution of alum. This supposition was confirmed by subsequent experiments.

Result of Experiments.	*Deduction.*
1. The fluid reddened blue litmus.	1. The reaction of alum is acid.
2. A solution of acetate of lead gave a white precipitate, indifferent to nitric acid.	2. Formation of sulphate of lead.
3. A solution of nitrate of silver deposited a colourless, crystalline powder.	3. Formation of sulphate of silver.
4. Ammonia gave a somewhat gelatinous, colourless precipitate.	4. Basic aluminic sulphate.
5. Chloride of platinum produced after a time a crystalline, yellow powder.	5. Formation of potassic chloride of platinum.

Alum, aluminic potassic sulphate was, according to these experiments, undoubtedly present, and, to judge by the deposits, in considerable quantity. Subsequent evaporation of 150 grammes of the fluid left a residue of five grammes. Having had his suspicions as to the presence of a considerable quantity amply justified, Herr Haugk did not think it necessary to inquire minutely into the other ingredients, as it was too ridiculous to think of alum and water being passed off as a *new* specific for the prevention of blisters, to be sold as a secret at five shillings a head! Evidently Herr S. has taken for his motto either—

"Mundus vult decipi, ergo decipiatur!"

or an equally applicable saying—

"Fools were made for knaves to fleece!"

Our Editorial Table.

ILLUSTRATED PRICE LIST OF PHOTOGRAPHIC APPARATUS.

Toronto: Ewing and Co.

We have received a compendious trade catalogue of photographic requisites from Messrs. Ewing and Co., Toronto. It is well printed and copiously illustrated. We always examine catalogues of makers and dealers who reside at a distance with much interest, as from such a catalogue an excellent idea of the leading features of difference between home and foreign articles of produce is acquired. It is in cameras more than anything else that American apparatus presents a distinctive feature when compared with those of European, and especially of London, design and manufacture. The American portrait camera is an "institution" replete with swinging arrangements, with screws, hinges, frames, and fittings. Those that we have seen were well made, and presented an imposing appearance. In Messrs. Ewing's catalogue we find ten engravings of cameras, only one of which is precisely similar to anything made in this country. Judging from appearance, the portable landscape camera of our own country is lighter and more compact than that of our transatlantic brethren. In camera-stands we do not perceive any difference between theirs and ours. The American "perfect camera-stand" has long been known in this the country of its birth under the designation of the "archimedean stand." The "excelsior" stand certainly does present some points of difference in construction, although none in principle, from our cheaper forms of archimedean stands.

A useful feature in the catalogue before us is a series of short notes on chemicals and formulæ, compiled by Mr. R. D. Ewing, with a few extracts from which we conclude. We may premise that these notes are not intended to teach those who know more of photography than the author, but only to assist the beginner, and as a reminder to the more experienced:—

"*Ammonia Liquor Fortis* can be bought of almost any strength. The American, which can be bought as low as twenty cents per pound, is very weak, and, contaminated with adulterations from the gas water with which it is made, is quite unfit for photographic use. The English ammonia, 880°,

is pure, and the only one we can really recommend. Avoid cheap liquor ammonia; it is by far the dearest, being only ammonia water.

"*Ammonia, Nitrate of*, is used by many photographers in the printing bath. Thirty grains of silver, twenty grains of nitrate of ammonia to each ounce of water, is a good formula. Messrs. Anthony, of New York, state there is a large saving of silver by its use.

"*Acetic Acid* should only be of the best quality; we have found much of it quite unfit for the developer, causing streaks and stains. It is often adulterated with sulphuric acid, making thin negatives and causing the exposure to be very much lengthened. Beaufoy's is pure and of full strength; we can warrant it.

"*Acetic Acid* (Tulley's).—A pure acetic acid, in combination with an *organifier*. Qualities: it requires less than one-third the usual quantity, thus favouring rapidity, and adds greatly to density, thus giving good printing negatives without redevelopment.

"*Glacial Acetic Acid* should alone be used for the negative bath when nitric is not preferred, and is better than all other acids in the developer when the finest work is desired.

"*Alcohol* should not be less than ninety-five per cent. when used in the collodion.

"*Collodions.*—Whilst your own collodion may not work, another may; and if none of them will work satisfactorily you may be sure that your bath is out of order. For this purpose at least three kinds are invaluable.

"*Collodion Formula.*—We give the quantities needed, and a little explanation that will enable any photographer to make his own, and of any quality required:—

Four grains of cotton to one ounce of liquids are sufficient for ambrotype collodion.
Six grains make a full-bodied collodion for negatives.
Five grains of iodides are sufficient for negatives.
One grain of bromide to above makes an intense collodion.
Three or four grains of bromide make a soft collodion.

"*Papyroxyline* (soluble paper).—This is an excellent soluble material for the collodion. We have made some of our finest collodions with it; being structureless it is excellent for ambrotypes. In making our own collodion we always like to have a variety of cottons, so that we might vary according to circumstances.

"*Dextrine.*—One of the best mountants known to us. Beat up forty grains in each ounce of cold water till smooth. Bring to the boil, and when cold it is ready for use. Does not require to be heated, and keeps well.

"*Iron Protosulphate.*—Be careful that your iron does not contain free sulphuric acid when used in the negative developer; if on trial you find it does so then add one grain of acetate of soda to each ounce of developer.

"*Iodine, Tincture of.*—If your collodion be very clear and have a tendency to fog a drop or two of this tincture added to the collodion (just enough to make a straw colour) will often greatly improve it. Do not buy this from druggists; they sell a compound tincture only useful in medicine.

"*Judson's Dyes.*—One of the best things known for colouring prints. If you wish your prints pink just add a few drops of a magenta or pink dye to your last washing water; you can get any tone you wish. For landscapes, green; skies, blue; and all nicely graded by dipping alternately.

"*Marine Glue*, for mending glassware, repairing corners of kit frames, making dippers, &c. It is invaluable to the photographer both for making and mending, will not hurt the silver bath, and will stand water and most acids.

"*Henderson's Baryta Sensitiser.*—THE BRITISH JOURNAL OF PHOTOGRAPHY states that this solution does all that is claimed for it—increase of sensitiveness, immunity from pinholes and stains, and that the bath will keep in working order till the last drop. *Formula for use.*—Add from two to six drops to each ounce of bath solution.

"*Printing.*—We call attention to the fact that some names are too short to make a tasteful design when only the first letter of the christian name is given—*e.g.*, John Smith if written J. Smith—and as many photographers wish their cards printed lengthwise it would be much neater to give the name in full:—'John Smith, Photographer, Almonte.' And we have to caution photographers against giving definite instructions for a particular letter, since no two printing establishments in Ontario have exactly the same style of type; it would take one establishment to have hundreds of founts to match every style. Best leave, as much as possible, to the good taste of the printer.

"*Nitrate of Silver Bath for Negatives*—

Silver	1 ounce.
Distilled water	11 ounces.

Add a few drops of a ten-grain solution of carbonate of soda till it looks slightly muddy; shake well; and if you have time set in the sun, filter, and add two drops of pure nitric acid to each quart of solution, and try a plate with an old collodion. If it do not work clear add a drop or two more nitric acid; no other ingredients are needed.

"*Collodion.*—We add a few good formulæ for those who would like to make it for themselves;—

Collodion.—Ordinary Bromo-Iodised.

A.—Sulphuric ether	20 ounces.
Alcohol	10 ,,
Pyroxyline	$2\frac{1}{2}$ drachms.
B.—Iodide of cadmium	90 grains.
,, ammonium	90 ,,
Bromide of ammonium	40 ,,
Alcohol	10 ounces.

One part of B (the iodising solution) must be added to three parts of A, which ought to be labelled 'plain collodion.'

Collodion (Libby).

Ether and alcohol	Equal parts.
Papyroxyline	6 grains to the ounce.
Iodide of ammonium	5 ,,
Bromide of cadmium	$2\frac{1}{2}$,,

A Good Collodion.

Alcohol and ether	Equal parts.
Bromide of cadmium	1 grain.
Chloride of calcium	1 ,,
Iodide of cadmium	5 grains to 1 ounce of collodion.

The salts should be dissolved in the alcohol in the order given above, then the cotton added, and well shaken before adding the ether. The quantity of cotton to be used will depend to a certain extent on the kind used. There need not be any variation in this respect from the ordinary quantity of the particular cotton anyone is using.

"*Formula for Positives*—

Alcohol	1 ounce.
Ether	1 ,,

"*To Prepare*—Put alcohol and ether together. Grind in a small mortar ten grains iodide potass., using a very little water; when dissolved add it to the alcohol and ether, shaking after each addition. Let stand an hour, then filter. Grind in your mortar six grains of bromide of ammonium, using the iodised alcohol and ether to dissolve it. Add gun-cotton ten grains. Let stand two or three days to ripen.

"*Developers for Negatives*—

No. 1.

Protosulphate of iron	$\frac{1}{4}$ ounce.
Glacial acetic acid	$\frac{1}{4}$,,
Alcohol	$\frac{1}{2}$,,
Water	8 ounces.

No. 2.

Ammonia-sulphate of iron	75 grains.
Glacial acetic acid	75 minims.
Sulphate of copper	7 grains.
Water	3 ounces.

No. 3.

"Use a wide-mouthed bottle; one pound of protosulphate of iron; one pound of iron and ammonia; one ounce of sulphate of copper. Add sixteen *ounces* of water; agitate thoroughly. This is my stock solution. To use I take a sixteen-ounce bottle, in which I put twelve ounces of water, then add enough of the stock solution to bring it to the required strength, which is determined by testing with a hydrometer. I usually use my developer about twenty grains; your hydrometer will indicate twenty-five.

No. 4.

"Four ounces of protosulphate of iron; sixty-two ounces of water (warm); six ounces of acetic acid, No. 8.

No. 5.

Compound Developer.

Sulphate of potassium	$\frac{1}{2}$ ounce.
Double sulphate of iron and ammonium	2 ounces.
Sulphate of iron	2 ,,
Soft water	64 ,,

Dissolve the ingredients in the water in the order named; then add fifteen drops of concentrated ammonia and shake well; then filter, and add four ounces of acetic acid, No. 8; then add five drops C. P. nitric acid.

"*Redeveloper*—

Pyrogallic acid	3 grains.
Citric acid	2 ,,
Water	1 ounce.

For intensifying it is advisable to increase the proportion of water.

"*Developer for Ferrotypes*—

Protosulphate of iron	$1\frac{1}{2}$ ounce.
Nitrate of baryta	1 ,,
Water	1 pint.
Alcohol	1 ounce.
Nitric acid	40 drops.

Fixing solution for negatives—saturated solution of hypo.

For ferrotypes—cyanide of potash, twenty grains; water, one ounce.

"*Border Negatives.*—To make border negatives make a saturated solution of Epsom salts; take an 11 × 14 plate and put a little wax around the edges; level the plate, pour the solution over it, and let it stand until it crystallises; then take as many negatives as required.

"*Lubricator*—Burnishing made easy.—As there are so many of the photographic fraternity using a burnisher of some make or other, and as the usual method of using alcohol or water with soap in solution is open to serious objections, we propose the following as a substitute:—Take water six ounces, white Castile or soda soap quarter ounce; dissolve by heat. When dissolved take a cloth—or, better, a sponge—perfectly clean, and immerse it in the solution, squeeze slightly and dry. When ready to burnish rub the surface of the photograph with the dry sponge or cloth and burnish; the result will be all that can be desired. The objections to using the alcohol or water with soap in solution is that the enamelled surface of the nicer qualities of card-mount is soluble in alcohol, and the enamel of cheaper grades in water; in either case there is danger of getting particles of enamel on the burnished plate, the heating causing it to adhere and injure the surface of the next photograph burnished. By using the sponge there is no danger of raising the enamel, and no liquid being applied the surface of the card and photograph is uninjured."

Meetings of Societies.

MANCHESTER PHOTOGRAPHIC SOCIETY.

THE annual meeting of this Society was held at the Memorial Hall, on Thursday evening, the 12th inst.,—Mr. W. T. Mabley in the chair.

After the minutes had been read and passed, the Secretary read the

ANNUAL REPORT.

THE annual report of the past session is not of the encouraging character your Council would desire to record. There are fewer members in the Society—sixty-eight against seventy-seven—and only four papers have been read during the year. This falling off in the matter of papers may have arisen from the fact that the members of your Society are so fully satisfied with the process adopted by its leading practitioners that they have little or no disposition to experiment with the newer methods of producing negatives. Yet, whilst admiring the devotion displayed by these gentlemen in their adherence to what is known by them to be good, your Council are of opinion that a useful and, possibly, a profitable experience might be secured by more attention to, and practice of, the popular methods of the time. It is not to be expected, nor even advocated, that gentlemen should go abroad to secure pictures by any untried method; but, as a matter of study, it might be worth while to try what those processes, of which we in Manchester seem to know so little, are worth.

Amidst the fluctuations of the number of members your Council are pleased to find the oldest and best workers are faithful to their little community; and, although set subjects for discussion have not been by any means numerous, your Council congratulate you on the fact that a fair amount of matter for all practical purposes has been forthcoming at almost every meeting. Still your Council feel that, unless a constant effort be made to increase the number of members, and thereby the funds, and to benefit the Society in every way, it is certain to suffer.

Leaving these matters for your careful consideration, your Council find the following papers have been before you during the session:—

On Art in Photography and Mr. Rejlander. By Mr. J. B. Forster.
On the Preparation of Emulsion Plates. By the Rev. Canon Beechey, M.A.
On Prolonged Exposures by the Wet Process. By Mr. J. Pollitt.
On a Modification of the Collodio-Albumen Process. By Mr. W. D. Sanderson.

It is hardly worth while to recapitulate the other numerous and interesting objects and subjects that have come before you at the meetings, and for which your Council beg to thank all those gentlemen who so promptly responded to the wishes of the Secretary.

The attendance at the meetings averaged twenty-eight, being the same as during the previous year.

The twenty-first anniversary was celebrated at Alderley, on the 12th of August, when the small company assembled had a pleasant day's out.

Your Council cannot forego the present opportunity of urging all the members to renewed activity, and beg to tender their sincere thanks to each and all who have contributed in even the smallest degree to the interest of the meetings.

The Treasurer's accounts will be submitted to you for approval.

The annual report was accepted, and the Treasurer's accounts passed.

Messrs. W. Hellawell, W. C. Mountain, C. Pearson, and T. Sefton were elected members of the Society.

The election of officers for the ensuing year then took place and resulted as follows:—

President: Mr. Alfred Brothers, F.R.A.S.—*Vice-Presidents:* The Rev. Canon Beechey, M.A., Messrs. Thomas Haywood, G. T. Lund, W. T. Mabley, and M. Noton.—*Council:* Messrs. John Brier, jun., W. G. Coote, J. T. Chapman, J. Frankland, J. Pollitt, J. C. Sewell, I. Wade, E. Woodward, John Warburton, and N. Wright.—*Treasurer:* J. H. Young.—*Hon. Secretary:* Charles Adin.

It was then resolved—"That cards of membership, signed by the Secretary, be issued to the members."

Mr. Lund showed a print from a negative taken on a collodio-albumen plate, sensitised seven years before exposure. It was evident, from the quality of the print, that the negative was clean and good.

Mr. D. Young showed some prints in printers' ink, but could not say how they had been produced beyond the general statement that a film of gelatine on glass had been employed to print from.

Mr. Atherton presented three views of *Chorley Old Hall* to the Society's portfolio.

The customary votes of thanks were accorded to the Chairman and others, and the meeting was adjourned.

BERLIN PHOTOGRAPHIC SOCIETY.

THE first meeting for the season of this Society took place on the 15th September, when Dr. Vogel resumed his office of President, which had been filled by Herr Prümm during the absence of the former gentleman in America. On entering Dr. Vogel was welcomed with hearty cheers, and the presidential chair was decked with flowers in honour of his return.

Herr PRÜMM read a letter from the Berlin Association of Photographic Assistants. In the letter the Associated Assistants represent that one of the principal ends their society has in view is to establish an agency by which employers may meet with the assistants of whom they are in want, and members of the society out of employment find situations. In recommending employers requiring assistants to give an intimation of the vacancies in their establishments to the bureau of the Assistants' Association, the Associated Assistants mention—firstly, that they have members in many other towns besides Berlin, and that they are also in connection with a similar association of long standing in Hamburg, so that "an extensive assortment" of expectant *employés* is almost always at hand; and, secondly, that their agency is the cheapest extant, as, should an engagement be made through their negotiations, no fee whatever will be charged either to employer or *employé* further than the franking of all correspondence.

Dr. VOGEL then laid upon the table three specimens of Kurtz's crayon pictures, which were much admired in America. They are very much enlarged copies upon common indigo paper. Upon the wrong side a chalk drawing is made with powerful strokes. The latter is produced by stretching the original picture upon glass, and then holding it up against the light and tracing the outline upon the wrong side. The drawing in fatty chalk so obtained, when drawn through a burnishing press, throws off several impressions upon slightly damp paper having a grained surface suitable for an artist to work upon. He (Dr. Vogel) hoped at a future time to be able to show some of these specimens after they had been worked up by an artist. The principal recommendation of these pictures is that their foundation is no longer a photograph, and therefore liable to fade, leaving the working up in chalk unpleasantly prominent; they also allow of the greatest artistic freedom of treatment.

The proofs were attentively studied by all present, and met with general approval.

Dr. VOGEL then gave a description of Kurtz's magnificent studio in New York, which, he said, was the most beautiful of all those he had seen. It consists of a block of buildings especially erected for photographic purposes, with a splendid frontage to Madison-square. The ground floor is occupied by shops, and the three upper floors by the photographic establishment. On the first floor is the reception-room, decorated with choice specimens of Mr. Kurtz's work. Above that there are two glass-houses—a small one on the second floor, with a projecting balcony, for taking children, and another fifty feet long on the third floor. The whole establishment is beautifully fitted up, and supplied with all the most convenient appliances.

A collection of photographs, by Sarony, of New York, were next handed round. They were artistically-lighted and well-posed portraits of a number of American artists, both male and female. The backgrounds used were in remarkable harmony with the sitters—a very unusual occurrence when scenic backgrounds are employed, which, being made the subject of remark, Dr. Vogel said that the backgrounds in question were painted by Mr. Seavey, of New York—a background painter so tasteful that it would be difficult to find his equal in Europe.

A provincial member having expressed a wish that Busch's new aplanatic lens should be tested by a committee of the Society it was arranged to communicate on the subject with Herr Busch.

A second provincial member asked how the albumen film could best be removed from albumenised paper without destroying the film, and was answered that such an operation, especially under the conditions named, was almost impossible.

Herr GRÜNE recommended the placing of a soluble film between the albumen and the paper support, such as casein; but even with a middle film it would be difficult to avoid distorting the delicate skin of albumen.

This terminated the business of the evening; but after the adjournment of the meeting the members celebrated the safe return of their President at a banquet given in his honour.

Correspondence.

PHOTOGRAPHY ON WOOD.

To the EDITORS.

GENTLEMEN,—I have tried Mr. Edward Pocock's formula for photographing on wood for the first time, and have succeeded without any trouble. It is simple and effective, and, above all, the film does not shell under the graver.—I am, yours, &c., JOHN SWAIN, JUN.,
266, *Strand, London, October* 23, 1876. *Engraver on Wood.*

JOHNSTON'S NEW EMULSION.

To the EDITORS.

GENTLEMEN,—I see that you have not succeeded with the new emulsion. I am very sorry for it. From the description you give of the behaviour of the first emulsion that you made it appears there has not been enough albumen added.

The adding of the albumen, I must allow, is rather guess-work; on that account I should have stated a little more of my experience with it. In the formula the quantity of albumen is given to bring the emulsion to working condition, by being occasionally shaken up, with the least trouble.

Another method of adding the albumen is to add a considerable quantity without beating it into a froth—namely, four or five times the quantity given in the formula; then put small beads or pieces of glass in amongst the emulsion and shake up well; examine the emulsion often by spreading it on glass, and, as soon as the structure or crapiness has nearly disappeared, filter through cotton-wool into another bottle. There is always a little bromide of silver deposited, which I filter out along with the undissolved albumen.

The crapiness, with transparent lines, always happens in films when the emulsion is made with either water in the solvents or added to the silver.

Had the emulsion you made with your own collodion been filtered through cotton-wool it would have been ready for use almost as soon as it was made. It became utterly useless when it was allowed to stand till it became crapy.

I will send some more silver if you wish to experiment further with it; and I think I will make up some emulsion and send it, so that you may compare it with what you make.—I am, yours, &c.,

Glasgow, October 24, 1876. J. JOHNSTON.

[In the experiments we have made we have not used albumen at all, but shall do so in order to test its effect. One remark in the above letter appears rather inconsistent with what Mr. Johnston published at page 461. Compare the fourth paragraph in this letter with the following extract from Mr. Johnston's original article:—"It [the emulsion] is very repellent to water, and there is a great amount of structure in the films made with it; therefore, to free it from these objectionable properties, water must be added to the emulsion."—EDS.]

SOUTH LONDON PHOTOGRAPHIC SOCIETY.—ANNUAL TECHNICAL EXHIBITION.

To the EDITORS.

GENTLEMEN,—Will you kindly allow me to announce that the "Technical Exhibition" for this year will be held on Thursday, November 9th, at seven o'clock, at the House of the Society of Arts, Adelphi? Admission free.

Those who wish to exhibit objects in connection with the same will please communicate with—Yours, &c., EDWIN COCKING, *Hon. Sec.*

57, *Queen's-road, Peckham, S.E., October* 24, 1876.

THE PHOTOGRAPHERS' BENEVOLENT ASSOCIATION.

To the EDITORS.

GENTLEMEN,—Will you kindly allow me to announce through your columns that the President and Council of the Photographic Society of Great Britain have generously granted the Exhibition at 5a, Pall Mall East, on Monday evening, November 13th (the last evening the Exhibition will be open), for the benefit of the funds of the Photographers' Benevolent Association?

Tickets, sixpence each, can be had from me, or at the door of the Exhibition.—I am, yours, &c., W. T. WILKINSON.

174, *Fleet-street, E.C., October* 25, 1876.

INTENSIFYING NEGATIVES IN THE LIGHT.

To the EDITORS.

GENTLEMEN,—I have for some considerable time (two or three years) been in the habit of intensifying my negatives, when they require it, in a subdued white light, but I always *fix* them previously; that gets rid of all the objections to the practice. I think if Mr. G. W. Webster will give this method a trial he will be quite of my opinion.

I often let the negatives dry before intensifying—just moisten the surface at the top. Care must be taken not to intensify when the negatives are not evenly dried.—I am, yours, &c. O. C. SMITH.

Stroud, October 18, 1876.

THE PHOTOGRAPHIC EXHIBITION.

To the EDITORS.

GENTLEMEN,—Your correspondent, "A Lady," has clearly indicated, in the habit of procrastination, a leading cause of the deficiency of contributors to the present Photographic Exhibition. But, in addition to the laggards, there is a class—and not a very small one—which, having once achieved a success and obtained notoriety, considers that nothing further is to be gained by exhibiting, and either will not do anything for love of the art, or else is afraid of imperilling the reputation which has been already won.

A long acquaintance with photographers leads me to this opinion, which is confirmed by the very slight response made by old exhibitors in answer to the appeals to come forward which appeared in your Journal during the time of last year's Exhibition. Those who have been complaining of the early date, and allege that as a reason for not contributing, will at all events now have ample time for printing from the negatives which have been secured this year; but, to avoid the risk of being again behind time, they will do well to take a hint from Mr. William Bedford, whose choice exhibits now in Pall Mall were ready, as I learn from his letter to a contemporary, early in May.

It is such a great convenience to have the subject and artist's name on the mount of the picture, and the opinion expressed as to its desirability has been so unanimous, that the unfortunate regulation which forbade it will doubtless be rescinded. Information as to process or lens being without interest for the general public, which cares only for results, is better confined to the catalogue, where it may be found by those whom it concerns. The committee must have found that their rule placed them in an awkward fix, and so broke it.

Mr. Bedford has given a straightforward explanation, which shows that no charge of infraction can be imputed to him; but what can be said of the obliquity of vision of Mr. Cocking, who, quoting a portion of the rule respecting the glass or frame, failed to see (mentally) the words immediately following in the sentence, to wit, "all labels, names, particulars of processes, &c., *must* be placed at the *back* of the *picture?*"—I am, yours, &c., AN EXHIBITOR.

October 23, 1876.

ADVANTAGES OF DRY PLATES.

To the EDITORS.

GENTLEMEN,—In a recent number of the Journal I have found a letter on the subject of dry plates, in which the writer recommends dry plates to be used within twenty-four hours after they have been prepared. He states that they are not suited for taking views of dark nooks in glens, and that the requisite exposure is about twenty times as long as required for wet collodion plates. Any amateur who was thinking of giving dry plates a trial would, in all probability, be deterred from taking the trouble if he by chance read this letter. I therefore venture to ask you to give my letter a place in the Journal, as I hope I can safely give a very different account of the action of dry plates.

I ought, in the first place, to state that I am no novice in photography. I commenced my labours very soon after Daguerre introduced to the world the daguerreotype process, between thirty and forty years ago. I delighted in the work, and have endeavoured to make myself acquainted with almost all the processes that have been brought forward during this long period. My chief amusement was in taking views of mountain scenery, and living entirely in the Highlands of Scotland I had ample opportunities for indulging my taste.

Like all other out-of-door photographers I was obliged to carry to distant hills a horse-load of apparatus, a tent, baths, &c., &c. This was very inconvenient, and, when I found that dry plates had been much improved, I gave up the wet collodion process, and for the last ten years have stuck to dry plates

I do not prepare my own plates; I should as soon think of making my own gunpowder. I use either the Uranium Dry-Plate Company's plates, or those of the Liverpool Dry-Plate Company. But now as to the results.

1. Instead of finding it advisable to use the plates within four-and-twenty hours, I can find no difference whatever in plates that are newly prepared and those that I have had in my possession for eight or ten months. I have a package, dated 1870, which I shall soon open and try. I have preserved it as an experiment, and I expect the results to be satisfactory.

2. There is no difficulty in taking views of "dark nooks" in glens. The dry plates have quite as much depth as the wet.

3. Instead of requiring an exposure *twenty* times as long as is necessary with wet plates the "extra rapid" plates prepared by the Uranium Dry-Plate Company or the Liverpool Dry Plate Company are quite as rapid as any wet collodion plates I ever used.

4. It may be said, in contradiction to this statement—"What is your proof of their being equally rapid in their action?" I will give it.

I have got a deer forest, and it is a great amusement of mine to photograph living red deer. I have got a good many negatives of them which must have been taken in two or three seconds. I shall mention one case. Last winter—the ground being covered with snow and a most brilliant sun shining—I got very near a stag; he was feeding, his hind quarters being next to me. I focussed, put in and drew the slide, the cap being on the lens. I waited until he raised his head, as he was not steady while feeding. At last he did so, but instead of standing steady he began to move slowly away. As an experiment I took off the cap and replaced it as quickly as possible—in, say, a second—and got a perfect negative.

I can quite excuse photographers resident in London saying that they would like to see this marvellous negative. I shall with pleasure indulge them. I shall send it and one or two more negatives of living deer to the Autotype Company to be enlarged—at present they are on small plates 5 × 4—and they shall subsequently be sent to the exhibitions of the photographic societies of Edinburgh and London.

In conclusion: I can with confidence recommend amateurs who like landscape photography to use dry plates. The ordinary plates are quite as good as the "extra rapid" for landscapes. If they wish to take pictures of living animals they should adopt the "extra rapid" plates.

The lens I use for animals is one of Dallmeyer's rapid rectilinear lenses, which are not only very quick in their action, but have great depth of focus.—I am, yours, &c., HORATIO ROSS.

Wyvis Lodge, Evanton, Rosshire, October 21, 1876.

EXCHANGE COLUMN.

ANSWERS TO CORRESPONDENTS.

☞ *Correspondents should never write on both sides of the paper.*

Rev. W. J. Whiting.—Received.

Anxious.—Filter the solutions and all will go right.

C. V.—Mr. Guppy died nearly two years ago. His forte lay rather in portraits than in landscapes.

J. H. T. (Birmingham).—We are glad to learn the result of your experiment; we shall not require to see a specimen.

S. Speakman.—We cannot suggest any other preventive of mildew on the enlargements than keeping them in a dry atmosphere.

L. D. C.—The rounded, or convex, surface of the plano-convex lens must be placed to the front. If this be not done the definition will be very imperfect indeed.

G. T. C.—Yours is purely a question for a lawyer. There are manuals published at sixpence or a shilling from which you will derive the necessary information concerning the action of bills of sale.

Thulie.—Thanks for the view of Lerwick, which is none the less interesting because it is the work of the most northerly-situated artist in the United Kingdom. The other matter will receive attention.

B. Munroe.—To increase the purity of the whites add a little nitric acid to the developer until the whites appear very metallic. Then add, carefully, sufficient acetic acid to destroy the metallic appearance.

A. B. C.—There must be some impurity in the chemicals, for the composition of the toning bath is quite good. Examine into the condition of the sensitising bath, and also try the effect of fuming the paper.

George Fœrenbach.—You have made a mistake in having the solution of chloride of platinum so strong. Add six or eight times its bulk of water, and you will then find that it will be more manageable in its action.

D. S. S. B.—Yes; rays of high can be converted into rays of lower refrangibility. Are you acquainted with the nature of fluorescence? If not, we advise you to bestow a little attention upon that most interesting subject.

Disappointed.—It is evident, from your experience, that the rule will not apply to *every* lens of the "rapid" *genus*. Our experiments were made with the productions of various makers—not, however, including the maker of yours.

Old Bath.—There is no private mark by which the genuineness can be determined; but each article bears the name of the maker. We could pronounce an opinion on this matter after seeing almost any one portion of the combination.

Styx.—We are uncertain whether we saw gamboge first tried in 1870 or 1871 by Mr. J. W. Gough. We know, however, that in the latter year he communicated to us the fact of his having used this gum-resin in connection with collodio-bromide.

Wilkie.—If you apply the tongue to a print it will take the water-colours easily. To succeed with a dry process select one from one of the Almanacs published in connection with this Journal, adhering closely to the instructions given, and you will not fail; but you must not dry your plates over the gas.

One in Doubt.—There is no artificial light yet known by which you can obtain an enlargement under the circumstances detailed. Try either the magnesium or lime light, and use paper prepared as for the negative process, exposing it while wet, and developing the image with a saturated solution of gallic acid.

W.—We prefer a bath of ebonite for purposes requiring portability; but a friend possessing great experience has found that one made of wood saturated with a mixture of melted wax and paraffine answers very well. We have kept silver in a bath of ebonite for several months without its having undergone deterioration.

G. Jones.—The *rapid* tannin process consists in using a strongly-bromised collodion sensitised in a strong nitrate of silver bath, the plates being afterwards washed, flooded with a solution of tannin, washed again, and dried. Alkaline development must, of course, be had recourse to, for ordinary development will show no material advantage.

D. V.—We lay it down as a principle that any attacks upon such corporate bodies had better be made editorially than through the medium of unknown persons. If you can satisfy us that there is anything really wrong we shall most gladly ventilate the subject; otherwise we must decline having anything to do with the matter.

Bos. Vigor.—To ascertain whether the lens works sharply to focus, or, if not, to what extent it is out, make a copy of a sheet of music or other printed matter, which is placed *obliquely* in front of the camera, the focus being obtained with the full aperture of the lens on the central portion. If the part focussed on be sharply delineated in the finished picture, then all is well; if otherwise, you must note whether the sharpest portion of the finished picture be further or nearer than the point focussed upon. In an under-corrected lens it will be necessary to bring the objective nearer to the sensitive plate than the adjustment required to delineate it properly upon the ground glass; an over-corrected lens requires an adjustment in the opposite direction.

Countryman.—Chilling of the surface is usually caused by applying the varnish when the plate is too cold. We are here supposing that alcoholic varnish has been used. Remedy: heat the plate before varnishing. There are, however certain other varnishes which may be applied while the negative is quite cold, yet which will yield a glossy surface. Among these is a benzole solution of Canadian balsam.

Country Photo.—1. You may use the oil for the purpose mentioned; the camphor will not cause any bad effect.—2. The lens is one of French manufacture.—3. Orthographic and orthoscopic lenses are similar; they are not free from distortion notwithstanding the name. The rectilinear is a cemented double combination, and is free from distortion.—4. Try spirits of turpentine,—5. Let the ground side be out.—6. Weston.—7. Thirty grains to the ounce is meant.

F. R. S.—The explanation is very simple. When the bromide of silver on which the light acted was reduced by the developer that bromide was, in a sense, *converted* into metallic silver. Now, metallic silver is soluble in certain menstrua which do not act upon the haloid salts of that metal. If the bromide be converted into metal, and if the film be subjected to the action of nitric acid, it follows that the metal will be dissolved, but that the bromide will remain undisturbed.

R. J. D.—Our correspondent, who says he has only been very recently initiated in photography, inquires—What is a Stillman's tent? There are some very simple questions which cannot be easily answered, and this, we think, is one of them. There are many kinds of tents; and, so far as we recollect, the tent introduced by Mr. Stillman has this special feature—that in a box of suitable dimensions there are portable or expansible wings, so to speak, which increase its area to a very considerable extent. The first form of the tent was a square box, in which fitted sliding sides, also of a box form, in which the sides were arm pieces. But this was improved upon in the progress of time, and the sliding side-boxes gave way to textile fabrics, which were lighter but equally efficient. A visit to the Publishing Office of this Journal, and a conversation with those whom he may meet there, will lead to a much better understanding of this subject than our correspondent could obtain either through a formal article or by this brief notice.

Received.—*The Art of Retouching*, by Messrs. Burrows and Colton. In our next.—We embrace this opportunity of correcting a mistake which was accidentally made in the announcement of this volume in our advertising columns in last number. Instead of three shillings and sixpence, the price is only *two* and sixpence.

The Photographic Society of Great Britain.—The President and Council of this Society have issued invitations for a *soirée* to be held on Tuesday next, the 31st instant, at the Gallery of the Society of Painters in Water Colours, 5, Pall Mall East, at eight o'clock.

Bristol and West of England Amateur Photographic Association.—We have been favoured with a copy of the rules of this new society, from which we ascertain that the meetings will take place at half-past seven o'clock on the first Wednesday in each month. The forthcoming meeting is to be held on Wednesday next.

Childish.—A photographer held a woman's baby as security the other day until she could raise the required sum to pay for its picture.—*Liverpool Mercury.*

Mounting and Touching Pictures.—Mr. W. Harding Warner has favoured us with a copy of a pamphlet containing "Simple Rules for Mounting and Touching Photo.-Pictures." These rules are offered "with a view to encourage the collecting of photo.-pictures for scrap books and albums." It contains plain directions for melting and applying the glue with which the pictures are to be attached to the mount or leaf of the album in which they are to be inserted. It is, of course, not intended for photographers, but for the scrap-collecting public, who will find the directions practical and simple.

Photography in Court.—At the Marylebone County Court, on Friday last, the case of Taylor *v.* Rivers was heard before Mr. Serjeant Wheeler. The plaintiff, a photographer carrying on business in the Edgeware-road, sued the defendant, a professional singer, to recover the sum of £5 under the following circumstances:—Mr. Sampson, solicitor for the plaintiff, stated that the defendant employed his client to supply him with one thousand photographs of himself in costume, it being agreed at the time the order was given that the plaintiff's name should be affixed to the proofs by way of an advertisement. This arrangement not being objected to the plaintiff agreed to execute the work for £5, and the defendant paid down the sum of £2 10s. as a deposit at the time the order was given. This being the plaintiff's case, Mr. Berkeley, solicitor, said that two thousand photographs were to be supplied to his client, the defendant. His client, only receiving one thousand photographs, declined to pay any further sum until the order was completed. The plaintiff stated that he had executed a second thousand, but the defendant said they were included in the original order. As the defendant said he had no evidence to call in support of his defence, the learned judge ruled in favour of plaintiff for the full amount claimed, with costs.

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THE BRITISH

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ON SOME ANOMALIES CONNECTED WITH ORGANIFIERS.

The precise action of various organifiers upon the sensitive photographic film has given rise to a very considerable amount of discussion in various quarters, and there is, perhaps, at the present time no universally-accepted theory on the point. As a representative example we may instance tannin—the type of one class of preservatives, and the one, perhaps, more generally used than any other. This substance has, in turn, been credited with extremely anomalous properties. It has, for example, been put forward as a "sensitiser;" while, on the other hand, many hold—and, indeed, practice would tend to show—that it has the effect of lowering the sensitiveness of very rapid plates. Again: it has been regarded as a developing agent of some power, though a simple experiment will prove that it is capable of exerting a decided action in restraining development. Chemically it behaves towards silver as a reducing agent, but fails photographically in carrying out the idea that such is its nature; for, unlike pyrogallic or gallic acids, when added to the organifier it tends to clearness and brilliancy of result, with a total absence of any traces of fog, such as might be expected to arise from abnormal reduction. It may at first sight appear difficult to reconcile these conflicting views, but we are not indisposed to believe that the discrepancies arise from the different views and conditions under which the observations are made, and it is probable that a search into the matter may prove that there is a basis of truth interwoven with the apparent jumble of contradiction.

We will first consider tannin in its character of a sensitiser. The term which is frequently applied to it has, we think, been used by different writers with two clearly distinct meanings, namely, sensitiser and *accelerator*. By the former we understand an agent which renders sensitive a material hitherto unimpressible, while the latter merely increases the degree of sensitiveness already pre-existent. In the former capacity tannin may be said to act upon pure iodide of silver in its alleged insensitive state by bringing it within the power of the developer. This property was one of the earliest claimed for tannin, and has been supported by many well-known writers on photo-chemical matters, so that there can be little doubt as to its correctness. With regard to its accelerating action we cannot speak with such certainty, nor, indeed, do we really recognise its existence; we shall, however, have to depart slightly from the regular order of our remarks in order to demonstrate the grounds upon which this supposition is based and their fallacy.

The *rationale* of this sensitising action of tannin upon iodide of silver is supposed to rest in the affinity of the tannin for the halogen of the silver. The acceptance of this theory does not necessarily involve a belief in any actual chemical change or combination between the silver salt and the organifier, though we shall endeavour to show that such is probable; for it is quite within the bounds of chemical possibility that the silver iodide, after being acted upon by the tannin, though unchanged in composition, may exist in a state of molecular excitement, so to say, which predisposes it to succumb to the reducing action of agents, *per se*, incapable of producing such change. It must, however, be borne in mind that a film of silver haloid once subjected to the action of tannin retains the effect produced in spite of washing or independently of any lapse of time—a fact which points to the production of some permanent result, although analysis fails to detect the slightest change.

Turning to the other side of the question of sensitiveness we have to consider the matter from a different point of view, or rather, we should say, a different property of the preservative is presented to us. As we have stated, it is generally understood that the effect of a preservative containing tannin is to reduce the sensitiveness of the resulting plate.

We have had occasion to speak of the restraining action exercised by tannin upon development, and it seems to us that the supposed retarding influence of the preservative is rather to be charged to that score. This is proved by exposing a film treated with tannin, one half of which is washed whilst the other is allowed to retain the organifier. The difference will be sufficiently marked to show that the rapidity of the film is affected by the presence of tannin in the unwashed half; while a comparison of the remaining portion with a similar film unorganified demonstrates the fact that, though a gain in the quality of the image is secured by using tannin, there is no practical variation in the rapidity of working.

The restraining principle in question exists in varying degrees in most of the vegetable astringents, many of which resemble tannin so closely as to be indistinguishable from that substance by analysis, but which, nevertheless, behave in a different manner with reagents. Quinine and its salts possess the property to a most extraordinary degree, so much so, indeed, that films containing the most minute traces of that substance resist the action of a strong development for a very considerable period, quite irrespective of the length of the exposure. Thus, however fully exposed a plate of this description may be, it will develope slowly, as if from under-exposure, but it will be found that by the exercise of patience the same amount of detail may be obtained as would be the case with a similar exposure but less powerfully restraining organifier.

We mention quinine merely as exhibiting in an exaggerated form the same restraining power as tannin, and in order to show that this action does not necessarily interfere with sensitiveness. We also desire to point out how it is possible that the conflicting opinions as to the properties of various organifiers may take their rise.

In the face of these facts concerning the restraining power of tannin it appears difficult at first sight to account for its alleged developing power; but without going over the ground we have already trodden it will be sufficient to attribute it to some permanent effect produced upon the molecular character of the sensitive film which renders it susceptible of development under circumstances where such a result would otherwise be unattainable. Thus, though it is impossible to develope an image by means of a solution of tannin either neutral or alkaline, it is a well-known fact that a plate treated with this organifier may be developed by means of *alkali* alone, when such would not be the case where the organifier had been omitted.

The precise action of any preservative of this class would appear to be dependent upon the relative proportions in which the sensi-

tising (or developing) and restraining principles exist; for, as we have noticed, these proportions are extremely variable. It is thus that development by means of a cup of tea or coffee, in which the restraining action is very feeble, becomes possible, as humorously described by our correspondent "Mark Oute" in *Noctes Washingtonia*, and doubtless the list of possible developers is capable of considerable extension. The recognition of the two distinct properties of tannin, *et hoc genus omne*, will also assist in explaining the existing anomalies in its behaviour, and the opinions held regarding it.

THE *RATIONALE* OF CLOUDY SKIES IN PHOTOGRAPHS.

We have frequently drawn attention to the subject of clouds as an artistic adjunct to a photograph, and do not require to say anything more at present on that phase of the subject beyond this—that a landscape photograph deficient in cloud effects will not now be tolerated, the time having gone by when immaculate whiteness of a sky was a *sine quâ non* in a landscape photograph of the highest class. Hence the observations which follow will partake jointly of the scientific and mechanical, as contradistinguished from the artistic, aspect of clouds and sky.

At the last meeting of the South London Photographic Society, when Mr. Warnerke advocated the introduction of clouds into white sky negatives by means of a process fully detailed in his suggestive paper, an opinion was expressed by two or three of those present that delicate, fleecy clouds in a strong negative would be quite destroyed during the prolonged printing required to develope the details of the lower portion of the picture, and hence that the finest effects could only be secured by double printing, or putting in the clouds by a separate operation from a second negative. Putting aside the convenience of the "double-trouble" system over the other, and which involves a previous and protracted preparation of the negative, we are bound to confirm the correctness of Mr. Warnerke's observations. If any portion of a negative—for instance, a sky with delicate tracery of clouds—have an accurate relation to any other portion of the picture, and bear a true ratio in respect of intensity to the deepest shadow in the composition, it follows, as a matter of course, that if the printer do his work in a proper manner each portion of the negative will be accurately represented in the the print, on the principle of the value of relative intensity.

But we must put the query—*Is* there the imagined difficulty in obtaining natural clouds along with the landscape by a single operation? We contend that there is not. A skilful photographer would not give the same brief exposure when depicting a deep ravine as he would when the subject of his operations was a sunlit, white cottage; and, if these two contrasting elements of luminosity were unfortunately present in the same scene, common sense would dictate the necessity of masking the brighter subject during a part of the exposure in order to allow the lesser-lighted portions of the subject to become properly impressed upon the plate. Thus it is with sky and clouds. The latter radiating so much more light than a sombre forest-clad view *must* be exposed for a period of time shorter in the inverse ratio of their luminousness, otherwise they will be extinguished. We know very well that numerous pictures have been produced in which sky and land are in perfect and harmonious balance, the latter being enriched with clouds which are true to nature; but in many pictures, when the sky has been the subject of a second printing, the character and lighting of the clouds are altogether in antagonism to the scene depicted in the lower portion of the picture. A sky-shade adapted to the camera or lens, and capable of being adjusted to approximate to the outline of the landscape, will in nearly every case permit the most evanescent and fleecy clouds to be secured in all their natural beauty and detail. In portraiture this is done every day; the nicely-modulated, shadowy tints on a lady's face are accurately reproduced in the portrait, and this result is not achieved at the expense of the drapery. The principle here involved is the same as in landscapes.

What is the sky, and what is the nature of the light radiated from it as distinguished from that reflected from clouds, mountains, and other terrestrial objects? In this query we assume the clouds to be "of the earth, earthy." A few evenings ago we listened to an eloquent lecture by Mr. Moncure Conway, in the course of which he, in imagination, placed a philosopher on the summit of an Alpine mountain exploring the sky through a Nicol's prism. The light from the pure blue sky was found to be polarised, and the Nicol's prism cut it off, leaving a perfectly dark ground, against which the mountain peaks and clouds stood revealed in all the glory of a pure southern light. If we rightly understood Mr. Conway, his position was that from such an elevated standpoint the light of the sky was presumed to be completely polarised, whereas no such phenomenon occurs when the examination is made from a lower plane.

We have not had the opportunity of scanning the sky through a polariscope from the top of an Alpine mountain, and hence we are unable to speak with regard to the degree of darkness obtained by the Nicol's prism; but we are by no means unfamiliar with the effect produced from the level of an English standpoint. The sky is not rendered black as in the instance adduced, but it is *very* sensibly darkened, and (here is the point to which we specially wish to direct attention in this connection) the clouds are not affected in a similar manner. Hence a cloud so etherial as to be entirely obliterated by the strong light of the blue sky—so faint, indeed, as to be almost only the subject of the spectator's imagination—when subjected to the incisive examination only possible through a Nicol's prism, becomes instantly fully revealed, showing in form as an almost pure white upon a dark ground. This is the phenomenon presented in this country.

We think it very probable, however, that Mr. Conway did not overstate the matter in saying that the Alpine sky became black, for if, as we know it does, the pure blue sky polarises light only in proportion to its freedom from cloudy, aqueous vapours, it follows, of course, that the more free the atmosphere is from such gross particles the more perfect will be the polarisation, and consequently the more intense will be the contrast between the purity of the white of the clouds and the blackness of the background against which they float when examined through a Nicol's prism, which acts the part of a de-polariser, or analyser. Let us apply this to the phase of the subject which we are now considering.

If in front of the diaphragm of a landscape lens we mount a Nicol's prism of as short a length and as great a diameter as is possible when it is desired to include a wide angle, we shall discover that, while the light now emitted from the scene to which the camera is directed is lessened, the definition is not impaired, assuming the faces of the prisms to be properly polished. The prism with which we have had a camera fitted in order to test this matter experimentally cost only twelve shillings, and it certainly does all that we have described. Now, the prism being slowly revolved, there are two points in its rotation in which, while the landscape is unaffected, the light from the sky becomes darkened, that from the clouds being as strong as before. If, then, a sensitive plate be exposed to a landscape thus lighted, not only will the sky be softened, and the clouds rendered of a more "pronounced" and vigorous character, but if there be any sunlit water or shining objects in the scene, their sheen and glare will be eliminated and their garish effulgence superseded by an equally truthful but more pleasant, soft, and harmonious rendering.

SIMPLICITY AND CERTAINTY IN PHOTOGRAPHY.

For some years it has, we think, been too much the custom to write and speak of photography as if little real progress were being made, many even going so far as to suggest that, satisfied with the processes at present in use, undivided attention should be given to the development of the art-capabilities of the science.

While fully admitting the importance of developing to its fullest extent the art-aspect of photography we must not shut our eyes to the fact that there is still much room for technical improvement, and especially must we insist on the necessity for photographers generally making themselves thoroughly acquainted with what is doing and has been done in that direction. It is quite true that for

a considerable period there have been no such startling discoveries as those of Fox Talbot and Archer, nor indeed can we hope for any such to again appear; but on the foundation laid by those pioneers of the art there has gradually been raised, stone by stone, a superstructure which, although probably yet far from complete, is very perfect so far as it goes.

To anyone looking on, as it were, from a distance it is not a little surprising to see the pertinacity with which large numbers of both amateur and professional photographers adhere to the beaten path, and the difficulty with which they are induced to try any proposed deviation from it, as well as the readiness with which the novelty is abandoned after the most perfunctory trial. This latter arises, doubtless, from the fact that, having mastered the difficulties and attained to something like uniform success in the working of one particular process, they expect to succeed equally well with anything they may be induced to try; but, failing, lay aside the modification as unworkable, forgetting that each process has peculiarities of its own that must be understood before success can be achieved. For this cause we have often advised amateurs to adopt a process and adhere to it; but the advice must be taken with a limit, as ultimate perfection can only be attained by each keeping fairly abreast of the times, and working out for himself each real improvement in process or manipulation that may be introduced.

While many are pursuing the beaten path, more than half satisfied that no real progress has been made—as they are thereby saved the trouble of turning their attention to newer ways—the introduction of collodio-bromide emulsion and alkaline development has in a few years brought about almost a revolution in landscape work, or, at least, in the convenience and comfort of all who have fully adopted the process. Thanks to the zeal and energy of the few who have so persistently experimented and written on the subject it is now tolerably well understood, and but for the reasons already given would have been much more largely adopted than it yet is. As it is in some modification of that process that we, for the present at least, look for something like perfection in simplicity of photographic operations, we are anxious to again direct attention to its latest and simplest form—the dried pellicle.

While a process is in an experimental stage it is probably well that the experimentalist should, as far as possible, manufacture the material he uses; but when once it is generally adopted professional manufacturers may be trusted to produce a better article than can, as a rule, be made by an amateur. This has been the case with collodion, and will certainly be so with collodio-bromide pellicle also; and, therefore, we shall confine our observations in this article to experiments made with pellicle advertised as a regular article of commerce, except in so far as it may be necessary to compare results with others from ordinary washed and unwashed emulsions.

We may say that our attention was directed to this subject by the frequently-repeated statement that, compared with the ordinary unwashed emulsion, especially that containing a trace of free bromide, the washed or pellicle emulsion gave thin, feeble images, with much tendency to fog, under a necessarily-prolonged development.

The packet with which the following experiments were made was so put up as to be safely transmitted by post, and contained 180 grains, or eighteen grains for each of the ten ounces of emulsion it was intended to produce. The pellicle was in a granular form, not unlike broken tapioca, and of a pale primrose colour, which rapidly darkened on exposure to light. The washing seemed to have been effectually performed, as on a few grains being heated with water in a test tube no soluble matter was detected.

Three quantities, of eighteen grains each, were placed in separate bottles and dissolved in the proportion of solvents recommended by the maker—nineteen of alcohol to twenty-one of ether. One was made with ordinary alcohol of 60 O. P., one with methylated spirit of 62 O. P., and one with ordinary grain spirit of 66 O. P., as delivered from a Coffy's still without rectification; and we may say at once that, so far as could be seen, they were all equally good.

The pellicle was first moistened with the spirit, and on the addition of the ether it dissolved immediately. Within five minutes we were able to coat plates without a speck or flaw of any kind, so that the process of filtration recommended would seem unnecessary. The emulsion flows freely and gives a dense creamy film perfectly free from structure, and of the peculiar olive hue by transmitted light so well known to emulsion workers as indicating an emulsion in good order.

While fully recognising the value of much that has been written in connection with free silver, or excess of silver at certain stages of the operation, and the various restrainers that have been recommended, we believe that for ordinary work, where extreme rapidity is not essential, an emulsion with a trace of free bromide will be not only most easily worked, but will give, on the whole, the most satisfactory results. With such an emulsion, therefore, we compared that formed from the pellicle in question, and at first the results were not in favour of the latter. The pictures were poor, flat, and thin, refusing to take on sufficient intensity with alkaline development, although with pyro. and silver they were easily made dense enough. On materially shortening the exposure the result was much better; the tendency to fog altogether disappeared, and the image, although to an inexperienced eye much too thin, was of a rich greenish-yellow, so impervious to the actinic ray that an apparently thin film gave brilliant prints.

From the results of the foregoing experiments, which were made by simply pouring the emulsion on and off and drying the plates by artificial heat, we are inclined to believe that the failures complained of with washed or pellicle emulsions arise, in many cases, either from over-exposure or from insufficient appreciation of the non-actinic character of the deposit. With a view to get more apparent density we tried various preservatives or organifiers; but, with one exception, we prefer the simpler method of doing without them. The exception is the addition of ten drops of a thirty-grain alcoholic solution of tannin to each ounce of the emulsion. This materially alters the nature of the plates prepared with it—reducing the sensitiveness considerably—but giving much greater latitude, and, with perfect immunity from fog, admitting of development to complete opacity in the high lights. So great, indeed, is the latitude in exposure that we have just developed several fine negatives on plates which had been so long exposed that the image in full detail was visible when removed from the camera.

In emulsion pellicle photography would seem to have reached the very acme of simplicity, and too much cannot be said of those who have laboured long and hard to bring it to the state of perfection it has now attained. Success is within easy reach of the average photographer, and the *impedimenta* of the tourist, so far as material is concerned, may be easily carried in his pocket. Ether and alcohol may be obtained almost everywhere, while a few plates of glass and a bottle of gelatine to aid in transferring the finished films, a packet of pellicle, and a small bottle each of alcoholic solution of pyro. and ammonia are sufficient for a trip of several weeks.

In a previous article we gave the results of some experiments in development with ammoniacal vapour. In connection with those just recorded we have been trying a thin varnish of dextrine with pyrogallic acid on the dried emulsion film, and, so far as our experiments have gone, they give such promise of success that we intend to continue them, and return to the subject when they are completed

THE PHOTOGRAPHIC EXHIBITION.

[EIGHTH NOTICE.]

If there were nothing else in the Exhibition than the works contributed by the Autotype Company, those alone alone would amply repay a visit. Important in dimensions, excellent in tone, and admirable in the perfection of light and shade, the enlargements of this Company in the Exhibition furnish a useful lesson. After seeing these who that has any regard for soft, fine photographs of mammoth proportions would ever again seek to press into service the large portrait lens by which works of this character are reproduced in the crude and distorted form so characteristic of "direct" large portraits? To notice here all the works contributed by the Autotype Company is not possible, but there are some which demand attention. The

large portrait of *Her Majesty the Queen* (248), and which occupies, as it should do, the chief position at the end of the room, is doubly interesting from its being both a work of great intrinsic excellence and also the latest portrait of a royal lady so universally revered as is her Majesty. It is, we understand, enlarged from a negative by Messrs. Downey. The charming portrait of *H.R.H. The Princess of Wales* (243) must also command appreciative attention; but superior, if possible, to both of these is the portrait of *H.R.H. The Princess Frederika* (254), which is one of the most attractive portraits we have ever seen. In their treatment of groups and architecture the imposing pictures respectively of the *Group of the Lafosse Family* (261), from a negative by Mr. Lafosse, and the picture entitled *Modern Domestic Architecture* (231), from a negative by Messrs. Burton and Son, attest in a most unmistakable manner the ability of the Autotype Company to grapple with and successfully overcome the difficulties inherent in the treatment of such subjects. But really there are so many exquisite enlargements exhibited by this firm that some difficulty is experienced in selecting any for special notice. Their *House of Peers* (239), from the picture by Mr. F. Sargeant, is a photograph which, as respects quality, must be ranked among the finest reproductions that have ever adorned the walls of the room, despite the almost impossible nature of the composition; for when such a distinguished statesman as Lord Derby is standing addressing the house it is preposterous to suppose that only one idea pervaded the assembled peers, namely, that of "sitting for their portraits," even when this involves the large assembly turning their backs in a great measure upon the speaker, and, quite ignoring him, looking intently at something exceedingly interesting at the back of the hall, where the camera is supposed to be situated. With regard to incongruity of composition this picture must take rank with the well-known *Waterloo Banquet*, with the equally well-known *Fight Between Jem Mace and Tom King*, or with Rejlander's less known but equally ludicrous group of *The Solar Club*. But to return to the *House of Peers:* the Autotype Company, who are not responsible for the group arrangement of Mr. Sargeant, must be congratulated upon the manner in which they have fulfilled *their* part. Before leaving these exhibitors we must direct attention to a frame of nine Lambertype portraits (212). These portraits attest the value of the carbon process as applied to *small* portraits.

Mr. W. D. Sanderson exhibits three large pictures by the collodio-albumen process, in which he is an acknowledged adept. A view of *Aysgarth* (229) is singularly perfect, containing exquisite variations of distance. Scarcely less perfect are his views, *On the Ure* (247), and *A Trout Stream* (249), both of which are immediately underneath the large autotype portrait of the Queen.

Recollecting many beautiful photographe we have seen by Mr. Wm. Ferguson, we examined with more than usual interest his collection, the subjects in which are to be found in the lake districts of Westmoreland. In his *Grange, Borrowdale* (264), there are magnificent effects of light and shade, the detail of the mountain in the background being well brought out. *Derwentwater, from Archer's Bridge* (286), is a charming subject photographed in a bold and effective manner; and the *Lodore Fall* (226) affords us a peep at Nature in one of her wildest moods.

In an article in another page we speak of the advantages of having clouds in a landscape picture in lieu of the white skies which occasionally prevail. When we looked at four beautiful little views of scenery near Reigate (91), by Mr. C. A. Ferneley, we were impressed with the idea how much their artistic value would have been enhanced had they possessed skies of less purity.

Mr. Robert Gordon exhibits a considerable number of landscapes, fairly executed. We think, however, that better prints could be obtained from the negatives.

We are glad to see Mr. Russell Manners Gordon once more represented in the Exhibition. The pictures exhibited by this gentleman bear evidence of not having been very recently executed, nevertheless we are pleased at again seeing some of the works of this artist, of which *A Devonshire Cottage* (327) is a charming example.

On one of the screens are exhibited several specimens by Mr. W. M'Leish. There is a "something" about these pictures which arrests attention, but as they are placed in a dark corner the visitor would be compelled to remove them from their present position ere it become apparent what that "something" is. This we did, and found a printed card on the back of each, conveying the following information:—"Specimen of stereoscopic relief on a flat surface, taken direct from nature in the camera by W. M'Leish's patent natural relief lens." An intimation of this kind contains much to cause the critic to prick up his ears. Let us analyse one of these prints—*View at Fountain's Abbey* (317). In the first place there is no appearance of relief in the picture; secondly, there is a want of vigour about it caused by there being a little distance between the image and the paper by which it is backed, for the so-called stereoscopic effect has been obtained by backing a transparency with a sheet of paper and allowing a small space to intervene between them. This does not, and cannot, give "stereoscopic" relief, which is only possible when two pictures of an object are taken from dissimilar points of view and combined in the brain of the observer. Hence to obtain "stereoscopic relief" two pictures are absolutely necessary. Although we keep ourselves and our readers apprised of all that is going on in the direction of new patents, we yet confess not to have previously heard of the "patent natural relief lens" of Mr. M'Leish. We shall not now stay to inquire into the peculiar attributes of this lens, because, for one reason, we are naturally dissatisfied with an instrument which seems to be deficient in the great essentials of flatness of field, while it gives to some of the vertical lines in the architecture an unpleasing amount of curvilinearity and convergence. The latter, we are aware, is the fault of the operator; but the former arises solely from some inherent defect in the instrument.

We shall continue, and if possible conclude, our remarks on the present Exhibition in our next number.

RECENTLY PATENTED INVENTIONS.

No. XV.—YOUNG'S OXYGEN APPARATUS.

Having paved the way by our article of last week, we now supplement what was then said by publishing the text of the specifications. In this case we give both provisional and completed specifications.

My invention relates to that well-known apparatus in which oxygen gas is generated as required during the exhibition or copying of pictures through the medium of small retorts charged with material in the form of compressed plugs and heated by ordinary house gas.

According to the usual construction and arrangement of apparatus a gas-holder is employed which is used for that purpose only, and the whole, therefore, becomes very cumbrous and difficult to convey for use from one place to another. To obviate this I construct the gas-holder so that it may be arranged to contain everything that will be required for exhibiting or copying pictures, and in the following manner:—I construct the outer part of the gas-holder in two portions, one of which may be placed within the other, in order to provide for which I make the central tube in two parts, which may be separated by unscrewing. When in this form a casing is provided, within which the lantern, retorts, and all other necessary articles may be packed. When required for use the aforesaid two parts of the gas-holder are separated, and one of them having been turned end for end is capable of resting upon the other. To this part a frame is adapted having flanges, so that it may be turned as on a centre, and upon it the retort or retorts are mounted, capable of turning upon an independent centre. The said frame has uprights which carry a second frame situated above the retorts, and which constitutes a stand for the lantern, being secured thereto by V edges.

In constructing the retorts I provide them with lids at their outward ends, which are capable of being closed by screw clamps, and they may, therefore, be charged while they are in working position. In making the plugs of compressed material I press the said material into thin metal tubes open at one end and provided with perforations, the whole being placed in the retorts. To the closed ends of the said tubes I adapt hooks, by means of which they may be withdrawn when the material is spent.

Above the retorts I place shields to deflect the heat downwards, such shields being caused to turn upward when rotary action is imparted to the retorts.

That part of my invention relating to the retorts is applicable to making oxygen gas for general purposes.

The completed specification is as follows:—

My invention relates to that well-known apparatus in which oxygen gas is generated as required during the exhibition or copying of pictures

through the medium of small retorts charged with material in the form of compressed plugs.

According to the usual arrangement and construction of apparatus a gas-holder is employed which is used for that purpose only, and the whole, therefore, becomes very cumbrous and difficult to convey from one place to another for use. To obviate this I construct the gas-holding apparatus so that it may be arranged to contain everything that is required for exhibiting or copying pictures, and for forming a suitable stand for the lantern.

Another part of my invention consists in a method of constructing the retorts, and also in a method of charging them with material from which the gas is to be made.

In the accompanying drawings *fig.* 1 represents the whole apparatus set up for use, and *fig.* 2 a plan view, the lantern being removed. I will describe these in the first place, and then show how the several parts may be separated for packing. At 1 is a circular metal casing, within which is the gas-holder 2 provided with the tube 3 surrounding the pipe 4 which leads from the retort in use, this arrangement so far being that in ordinary use, as is also the pipe 5 for conveying the gas to the lantern 6. Upon the top of the casing 1 is another casing 7, formed, however, with openings as at 8, and upon this is placed a frame 9, the form of which is shown on the plan view, *fig.* 2; but the said *fig.* 2 represents another frame, above that now referred to. This frame is provided with parts as at 10, extending downward and abutting against the casing 7, and the said frame may therefore turn as upon a centre. Within the parts 10 are the heads of bolts, surrounded by thimbles 11, which carry another frame 12, 12*, shown in *fig.* 2, and this second frame is tied to the other by nuts 13. The bottom of the lantern 6 is provided with a board 14, one side of which has a square ledge 15 extending over one part 12* of the frame, and the other side a V ledge 16 fitting on to the other part 12^x of the frame, by which arrangement the lantern is prevented from tilting over, and it may be turned bodily upon the casing 7. At 17 are the retorts, capable of being turned upon the upper end of tube 4 and heated by the gas pipe 18. When the apparatus is in use the gas-holder 2 rises within the top casing 7, and it is formed with a projecting part 20 above its top for the purpose of facilitating the application of weights, the oxygen gas passing from the retorts and supplying the lantern in the ordinary manner. The pipe 4, according to my invention, is formed in two parts, united together by screwing at 21, and is provided with the usual directing bottom flange 22.

FIG. 1.

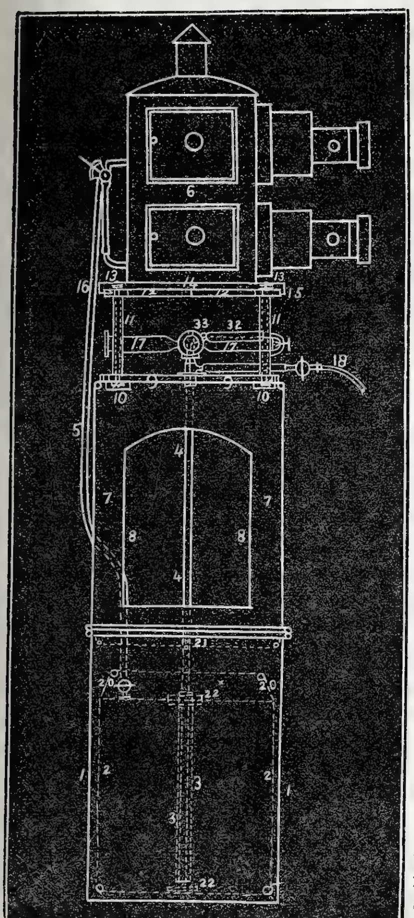


FIG. 2.

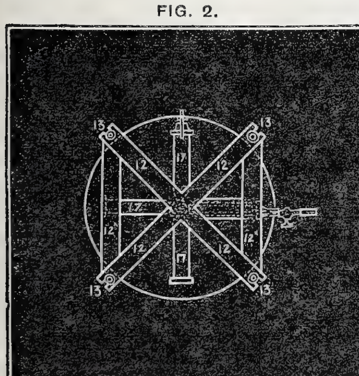
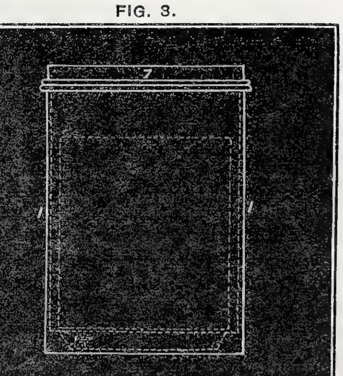
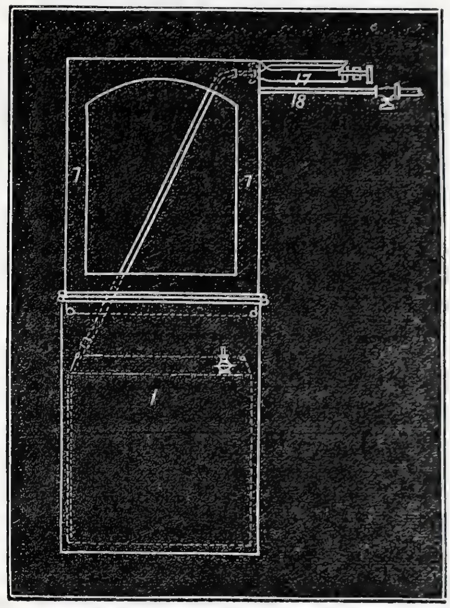


FIG. 3.



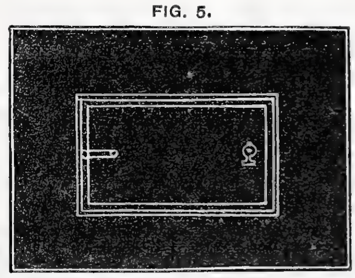
When it is desired to pack up the apparatus the lantern may be lifted from its supporting frame 12*, and this, together with the other frame 9, may be removed and separated by unscrewing the nuts 13. The retorts 17 and gas pipe 18 being then taken away, the pipe 4 is unscrewed at 21, and the top casing 7 lifted off, and then by unscrewing the nut 22* and turning the gas-holder 2 upside down, the tube 3 will slip off, and the whole of the parts will become substantially separated, but the order of their removal may, of course, be varied. The top casing 7, being now turned end for end, is placed in the other casing 1, and within this is placed the gas-holder 2, the several parts in these positions being shown at *fig.* 3, and they constitute a receptacle within which the whole of the apparatus may be packed, and any suitable cover may be adapted. I have found that if the casing 1 be about fifteen and a-half inches in diameter and twenty-two inches high ample room will be afforded to contain everything required.

FIG. 4.



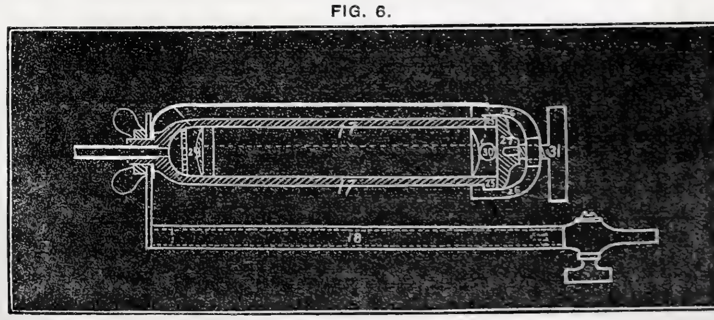
Figs. 4 and 5 show a modification, in which the casings 1, 7 are made square, and one retort 17 is used, which retort is fixed, or there may be more than one made to slide horizontally, or the gas pipe 18 might be moved.

FIG. 5.



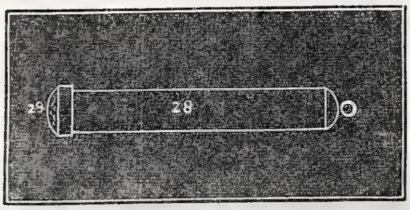
The next part of my invention is shown at *figs.* 6, 7. At 17 is the retort, and at 18 the heating gas pipe, the said retort being provided with a flange 25 for carrying a clip 26, which by means of a screw 31 tightens a cover 27 upon the end of the retort. According to the usual method of using these small retorts they are themselves made to contain the material for the generation of the oxygen. According to my invention I use a thin metal tube 28, in which the material is placed, and this tube is placed in the retort. At one end it is provided with a perforated cap 29 for the passage of the oxygen gas, and for the purpose, when removed, of adding fresh charges, and at the other end (which is closed) with a ring 30. When the material has to be removed the cap 27 is taken away by loosening the screw 31, and the tube 28 may then be drawn out by applying a hook to the ring 30, and another tube may then be adopted; if required, the removal of the retort, or the

FIG. 6.



handling of heated parts not being necessary, instead of complete tubes, semicircular or other shaped half tubes or dishes may be used, the object being to carry the charge by apparatus distinct from the retort. This part of my invention is applicable to making oxygen gas for general purposes.

FIG. 7.



In order to deflect the heat downwards there is a shield 32 over the top of the retort. In *fig.* 1 this shield is also shown, and there it turns upon a hinge 33, so that when the retorts are turned it is lifted.

Having thus described and ascertained the nature of my said invention, and the manner in which the same is to be performed, I desire it to be understood that I claim as secured to me under the above in part recited letters patent, and for the purposes above set forth—1. The method of constructing the casings 1, 7, and parts connected therewith, so that the whole apparatus may be contained therein as one package, and also that the said casings may constitute a stand for a lantern. 2. Constructing the retorts with a removable front as at *fig.* 6. 3. Placing the material for making the oxygen gas within tubes or other receptacles placed within the retorts.

TRANSFERRING GELATINE FILMS.

For some time past I have been trying every transfer process published to remove these films, but until recently without success. At length, when you published the method with transfer paper in the number of this Journal for 5th May last, I hoped it would answer for these films also; but on trying it I found the paper came away, leaving the film still adhering to the glass as firmly as ever. However, by modifying the process there described in the following manner, I am now able to remove these films with the greatest facility:—

An alcoholic solution of gelatine is first prepared, similar to that used for mounting, by soaking 180 grains of Nelson's opaque gelatine in water for several hours, then draining off the water and dissolving in two ounces of methylated spirit. This solution is then applied with a soft brush to a piece of ordinary tracing-paper about a quarter of an inch larger than the negative. I prefer tracing-paper on account of its thinness and transparency. The paper is next carefully laid down on the negative, the surface of which must have been previously well wet with warm water applied with a soft, flat brush, care being taken to avoid all air-bubbles, which would cause blisters in the transfer film.

When the paper is *thoroughly* dry it has only to be damped with a sponge, carefully lifted at one end, and peeled off the glass, bringing the film with it. The paper can then be rendered translucent by any of the usual methods, or I find ordinary rock oil used for lamps answers very well for the purpose, and dries quickly.

If it be desired to put the film back again on glass this can easily be done without any substratum, the film itself being already composed of insoluble gelatine. All that is necessary is to bring it in contact with the glass under water, allow to dry thoroughly, then place in a tray of warm water, and peel off the paper.

I enclose a film* transferred by the above method. L. S. D.

NOTES ON PASSING EVENTS.

By a Peripatetic Photographer.

After perusing some observations on an importation from France of pellicular masks for vignetting, I had, for nearly one whole day, pliant vignetting masks on the brain, and the number of these useful appliances that I turned out during my pellicular heat was something astonishing. Here are two of the methods I adopted, and in giving them I affirm most positively that they will enable anyone to manufacture the very finest masks:—

From a sheet of plain brown paper cut a few ovals of various sizes, and paste each of them on the centre of a plate of suitable dimensions. These will serve as *clichés* from which to produce as many masks as would serve to supply every photographer in the kingdom. Next, rub a little powdered French chalk over a glass plate, and then to the surface thus treated apply a coating of ordinary bromo-iodised collodion, and sensitise it as usual. In front of the plate thus excited place one of the glass plates, to the centre of which has been attached the oval paper, and give a brief exposure to light. The distance apart at which the two plates are fixed is one element in the determination of the softness of the edge of the vignette. If the light come from a diffused sky it is evident that it will creep in under the opaque oval to an extent determined by the facility it is afforded—a distance apart of half-an-inch for a mask of medium *carte* dimensions answering exceedingly well. If the light come from a point, such as a gas or lamp flame, it will be necessary to move the masks in a circular manner during exposure. Dry plates are rather more convenient than wet ones for this operation, but either will answer. When the developer is applied there is revealed a transparent oval aperture in the centre, fringed with soft, fuzzy edges which merge into total opacity. When the cyanide and washing water have performed their functions the plate is dried and a thin varnish of india-rubber is then applied; this, when dry, is followed by an application of thick collodion containing a large proportion of castor oil. After this latter application has become quite dry the application of the edge of a knife to the margin will enable the pellicle to be removed with the greatest facility.

Another excellent method—especially for pictures of large dimensions—is to sensitise a sheet of plain, non-albumenised paper and expose it in a printing-frame to diffused light behind a *cliché* of the kind described. It must be mounted about an inch in front of the sensitive paper, and when the margin has been printed to opacity it must then be fixed, no toning being required. A benzolic solution of Canadian balsam is next applied to the centre, by which the translucence is greatly increased.

"A Member of the Council" must certainly be laughing in his sleeve at the position in which he has got Mr. Vernon Heath. The former writer spoke of certain photographers as "extinct volcanoes," when up starts Mr. Heath and belabours him for his rashness. Surely the "cap did not fit" this gentleman; why, then, was he so hasty in putting it on?

I am not so fortunate as Mr. Horatio Ross in possessing a deer forest into which to take my camera when I want to expose a few dry plates; so when I try instantaniety in exposures of dry plates I have to operate on less noble beasts than the "antler'd monarch" of the forest. As a matter of fact, I secured an excellent negative on a dry plate of a scene which was intensely exciting to a few, physically and mentally, undeveloped members of the human family, and fraught with thrilling interest to at least one of the parties more intimately concerned. It was only the worrying of a rat by a Skye terrier. But the point of the narrative is this—the "death scene" was photographed on a dry plate. The exposure was as rapid as could be effected by a dropping shutter; the lens was a portrait combination; and the plate was prepared by a process published a few years ago as the joint invention of Messrs. Blair and Adams.

Bearing in mind that a charming grain is the characteristic of at least one of the mechanical printing processes practised in this country, and being aware that carbon prints also sometimes possess a similar grain, I have for some time been trying to obtain a like effect by the breaking up of the surface in the way hinted at in The British Journal Photographic Almanac of last year. But, from what has been published by M. Leon Vidal in his article *On the Action of Alcohol on Carbon Tissue*, I now entertain the opinion that in the use of this liquid—which at least will inebriate, if it fail to cheer—we shall find the clue to the granulation mystery. Blest alcohol! it imparts sensitiveness to the carbon tissue, and a delicate grain to its surface! In the dull, foggy weather about to approach in its usual annual force anything rendering our printing surfaces more sensitive cannot fail to be hailed as a great gain; therefore, all hail to alcohol!

With respect to the profusion of medals granted by the Centennial Exhibition Commissioners to exhibitors of this and other countries, it is not out of place to inquire whether such extreme lavishness does not entirely destroy the value of the award. Amiability on the part of the jurors may have prompted them to award medals to well-nigh every exhibitor; but if this were the impelling motive it is reprehensible. But there is a reverse side to the question; and it is possible that the merits of the various competing exhibits were so great and so equally balanced as to leave the jurors no option in their action.

What is the etiquette connected with secret processes? I ask this because during the past month "the cat has been let out of the bag" with regard to two processes which were sold to the public under the seal of secresy—those of Mr. B. J. Edwards's enlarging method and

* The transfer is perfect.—Eds.

of the combination negative system of Mr. Johnston, of Wick. What is a reasonable time for a secret process to be kept undivulged by the purchaser? If I give a man a couple of sovereigns as a *quid pro quo* for his having imparted to me a bit of information of which I previously was unaware, coupled with a stipulation that I must not say anything about it to another, how long is such stipulation to remain binding? and at what period of its duration may I speak of it to another without laying myself open to the charge of having acted dishonourably?

(To be continued.)

SENSITISING AND DRYING CARBON TISSUE.

How to manage the sensitising of carbon tissue is a matter generally understood, namely, to immerse it for about a minute in the bichromate bath, and hang it to dry. This drying requires the extended period of from ten to fifteen hours, in consequence of the thorough soaking of the tissue which has necessarily taken place. It is particularly from the back that the solution penetrates the paper, although it seems of no use, for the tissue needs only to be wetted on the pigmented side.

When Dr. Vogel, while at work, was in need of sensitised tissue he tells us how, with a broad, flat brush dipped in the solution, he stroked the black side of the tissue first in one then in the other direction, whereby, under favourable circumstances, the drying required only about an hour. To prevent curling, he beforehand fastened the corners of the tissue to a piece of board with tacks. Nevertheless he does not recommend this method for general practice. In respect to his silence concerning this point he may be right, for a repeated over-brushing may easily do damage to the smooth and tender pigment film—an injury which will inevitably be afterwards visible in the picture when completed; of course a general soaking must be given.

It is an annoyance to the carbon worker to find that during excessive heat, such as prevailed last summer, the film, while hanging for drying, is, on the contrary, becoming dissolved and running down from the supporting paper, and few photographers find it possible to have ice at hand for tempering the air and the solutions.

According to a suggestion from Dr. Monckhoven—certainly known long before—it has been advised to add some drops of sulphuric acid to the sensitising solution, which produces a satisfactory result, as it stops the melting tendency of the film. But this remedy requires skill in the operator to keep the bath in a proper state. However, if he do succeed in his efforts, and the drying of his tissue in a heat of 80° F. goes on normally, it will not, on the contrary, do so by a lowering of the temperature to (say) 65°. In the latter case, the subsequent development will become difficult, and if then he has recourse to hotter water, heated even to the boiling point, he nevertheless will get dark and dirty pictures. Besides, he does not know whether the obstacle has its origin in the change of temperature, or, it may be, in a continual increasing of the acidity of the bath. He is at length driven to the unpleasant necessity of every day examining and correcting it in accordance with the fluctuations of the mercury.

The hints of Dr. Monckhoven have not, consequently, enabled us to vanquish the obstacles connected with the state of the sensitising solution so far as relates to the changing temperature of the air, and hence we have to look out for further discovery and advice.

In this state of the matter it happened that, some days ago, Mr. V. A. Schulenborg, who had this summer been working diligently in carbon, paid me a visit, and when asked how he had succeeded he answered—"Very well; I am quite satisfied with my work." On further questioning him concerning the past hot summer and the injurious influence of the heat upon carbon work, he stated that in the course of the hot season he had not been annoyed in the least by the high temperature, neither had anything uncommon taken place while drying his sensitised tissue. On further inquiry, he made me acquainted with his method of working—a method rejected and ignored by the inventor (Mr. J. W. Swan) of the carbon process from its commencement. Managing the sensitising in the way used in the silvering of paper, he lays the tissue, black side down, carefully on the bichromate bath, and after floating one minute he conveys it to its place for drying, which requires but a couple of hours. As the paper itself has been kept dry, and the face only of the black film moistened, there is not the least chance of, or tendency to, melting or running down of the gelatine. On the contrary, a rapid drying of the film side instantly takes place, without the solution requiring any addition of either acid, alkali, or ice for lowering the temperature.

Mr. Schulenborg asssured me, furthermore, that after floating the tissue he gained finer and clearer pictures than through the originally-prescribed and commonly-used immersing. Probably the developing by this method may also advance easier in the water. When questioned as to whether the edges of the tissue, while resting on the solution, did not seem inclined to bend upwards and thus impede equal sensitising, he answered that he had not at all observed anything of the kind. Whether the same can be said in regard to the sensitising of large sheets remains to be investigated.

The result, then, of the foregoing may possibly be that henceforth floating is to be adopted and immersing relinquished; that an acidulation of the solution of bichromate of potash, even in the hottest weather, is unnecessary, as is also the application of ice for cooling; that an addition of alkali may be considered injurious during summer time, but serviceable in the winter season; and, finally, that the watching and continually correcting of the bath, in respect to its contents of acidity, will now cease. Peter Chr. Koch.

GLASS FOR THE STUDIO AND DARK ROOM.

Our readers may remember that at the meeting of the British Association at Brighton, in 1872, Mr. Thomas Gaffield, of Boston, read a paper on the deterioration of certain kinds of glass when subjected to light for a more or less prolonged period of time. This paper, introduced by some editorial remarks, was published in our issue for August 23rd of the year mentioned. The following observations by Mr. Gaffield, on the same subject, which appear in our Philadelphia contemporary, will form a useful addendum to what we have already published.

An experience of a few years as a manufacturer of, and of many years as a dealer in, glass has brought me into frequent and pleasant relations with the photographic fraternity, and led me to make several series of experiments, which have proved of some interest to its members.

The first, commenced in 1863 and pursued to the present time, concerned the action of sunlight in changing the colour or shade of many kinds of colourless and coloured glass. These experiments were kindly noticed in the photographic journals in 1867 and 1872, and are alluded to now only to show their connection with the second series, commenced in 1867, which concerned the action of sunlight on sensitive paper under differently-coloured glasses. I have exhibited some of the prints showing the results obtained to photographic friends in Boston, and to the societies in New York and Philadelphia, and brief notices appeared in the journals in 1868; but never having written a full and connected article on the matter, at the request of my friend, Mr. Wilson, I will make an humble effort to do so, hoping it will not be without some interest or value to the fraternity. With the same view I have also placed some of my illustrative prints in the Photograph Hall at the Centennial Exhibition.

Perhaps I cannot better commence my essay than by quoting the following passages from an article on my first series of experiments, which appeared in the *American Journal of Science* in 1867:—

"I have been pleased to find the interest in these experiments by photographers, who have long noticed that they could take better pictures under a newly-glazed skylight than under one which has long been exposed to sunlight. The cause of this change is that the slightest yellow colour interferes with the transmission of the actinic rays, and a very deep shade will cut them off in a very great degree. My experiments with glasses under other glasses proved which was the best for photographers' use—information which all can gain by exposure of the specimens of various manufacturers which may be offered them. The most pure glasses of light-green or bluish-white colour are the best for photographers; and when I say "*pure*" glasses I mean those most free from oxide of iron or manganese, but especially of the latter, which, I think, is the cause of nearly all the changes I have observed.

"Mr. J. W. Osborne, of New York, the gentleman who has done so much to bring the art of photolithography to perfection and into practical use, writes as follows:—

"'I believe your researches will prove of much practical importance, and I wish the glass manufacturers could be got to give serious attention to the subject. It takes but a very slight tinge of yellow to cut off twenty-five per cent. of the actinic rays. I am forced to work under glass because of the protection from the wind and weather, but, in doing so, I sacrifice in any case much of the light. I have to increase the time of exposure proportionately. With the best of glass the loss from reflection and absorption is considerable. This may be fearfully increased by the colour, and if that undergo a continual change for the worse the state of things is exceedingly unpleasant. I was warned by a photographic friend in England to take care of a certain kind of cheap French glass made for glass rooms, which turned

yellow, but I had no notion that the evil was so general as you appear to have found it. The subject is of such vital importance to photographers that I intend drawing the attention of that friend to what you have done.'"

I had frequently heard that yellow glass cut off more of the chemical rays of sunlight than any other colour. I was therefore desirous to test the accuracy of this statement, and also to know the comparative power of all the colours in this respect, for the practical purpose of ascertaining how far the changes of colour in colourless glass by sunlight exposure, alluded to by Mr. Osborne, were injurious to its power of transmitting these chemical rays, so necessary in some operations of the photographer's studio. I accordingly procured some glass of the red, orange, yellow, green, blue, indigo, and violet colours, cut them into the uniform and convenient size of 4×2 inches, and placed them in this order in a large pressure-frame upon a sheet of plate glass. I had one row of pot-metal, the name given when the colours permeate the whole body of the glass, the glass-blower gathering all his material from the pot of coloured metal. ("Metal" is the technical name given by manufacturers to glass in the molten state.)

I had another row under the first of flashed and stained glass, in which the colours are upon the surface only.

Flashed glass is made by the glass-blower, who, dipping his pipe first into the pot of coloured metal, gathers a small quantity and covers it with a much larger amount gathered from a pot of colourless glass, and then blows a cylinder, which is afterwards cut open and flattened out, thus producing a sheet which shows, when looked at through its edges, a colourless body with a skin or very thin surface of colour. The flashed colours are ruby red, green, blue, and violet. The stained colours are red, orange, and yellow, and are made by the glass-stainer, who takes the ordinary colourless glass, and, by brushing or floating on its surface, with spirits of turpentine or water, an oxide of silver, burns in the colour in the muffle of the staining kiln, the colour varying with the amount of oxide used from a light lemon to a dark red. This red stained is not so beautiful as the red flashed, made with oxide of copper, and generally called ruby. There is no sheet glass made of red pot-metal, as it would be almost entirely opaque, like the so-called black glass formerly used for ambrotype purposes. In order to have a complete set of specimens, however, a piece of red or ruby pot-metal was made for me at a flint-glass factory in my neighbourhood. To produce a print which should tell its own story I surrounded the two rows of glass with strips of brass, the upper one containing a description of the print cut out in small letters by a skilful stencil-cutter. The names of the various glasses were cut out of small pieces of brass in the same way, and affixed to them with Canada balsam, portions of the surface under the stencils being ground off and polished by the glass-cutter from the flashed and stained pieces, and, in order to let the light through the pot-metal specimens, a portion of the body itself was cut out.

To obtain for comparative purposes in the finished print a specimen of the original light colour of the sensitive paper and of the dark shade produced by full exposure to sunlight I placed a protecting piece of brass, 4×2 inches in size, at one end of the upper row, and allowed the same space in the lower row to be uncovered. I then placed a sheet of sensitive paper upon the glass, put on the necessary pad to make the pressure equal, closed up the back of the pressure-frame, and exposed the whole perpendicularly to the direct rays of sunlight at the studio of a photographic friend who fixed and toned my prints. I made a series of prints, showing the interesting effects of exposure for one, two, three, six, twelve, and thirty minutes, and for one, two, and four hours. The results showed a decided mistake in the common idea concerning yellow glass, under which a shading of the paper is seen in the finished print after the very short exposure of one minute. Instead of being first, it was fourth on the list in its power of cutting off the chemical rays.

The red cut off the greatest amount, showing no effect of shading in the finished print until after an exposure of thirty minutes. Then followed the orange, green, yellow, violet, and blue, in the order named.

From these early and some later experiments with glasses coloured on the surface, and others coloured throughout the body, my opinion is that a flashed or stained specimen of any colour will generally cut off as much chemical influence as a piece of pot metal of the same colour and shade. Indeed, I have some pieces which will cut off more, and probably for the following reason:—In the pot-metal the colouring material being diffused throughout the whole body furnishes not so strong a resistance to the passage of the chemical rays as the thin but very compact coloured layer which composes the surface of the flashed and stained specimens. Therefore, in making an experiment, or in procuring glass for the dark room, it will matter little whether we use the one or the other, provided we obtain specimens of a shade dark enough to accomplish the object desired.

By the substitution of some pieces of colourless plate, crown, and sheet glass in the lower row of my first print, and an exposure to sunlight of two or three minutes, I obtained an interesting print, illustrating the comparative power of colourless and coloured glasses to transmit the chemical rays.

I think I have heard or read of photographers who have placed blue glass in their studios, with the idea that they should thus obtain more of the chemical rays than by using colourless glass. This second print proved that all colourless glass, even the whitest and clearest plate, will cut off a certain, although small, proportion of the chemical rays; while the darkest and poorest colourless glass will transmit more than the blue—the best or most actinic of the coloured glasses. Colourless glass transmits easily and almost completely all the light, heat, and chemical rays of sunlight, a small percentage only being absorbed or reflected; while the blue cuts off a large amount of light and heat, and a very sensible proportion of the chemical rays.

THOMAS GAFFIELD.

(To be concluded in our next.)

A NOTE FROM THE FAR NORTH.

In his *Notes from the North* Dr. Nicol keeps his readers *au fait* in every photographic event that takes place within the "Modern Athens," and a considerable radius beyond; but he seldom penetrates so far north as "Aberdeen awa'." It would, however, be unjust to conlude that all photographic enterprise is killed in the granite city by the blighting frost; it is rather braced by the wholesome cold, evidence of which is Messrs. G. W. Wilson & Co.'s new printing and publishing establishment in St. Swithin's-street West.

The glass houses and reception-room, &c., are at the old place, but the lease of the former printing premises having expired, afforded an opportunity of concentrating the forces. Accordingly, when the printing department, which was formerly about half-a-mile further from town, was removed to the present premises, the publishing department was also transferred to the new and commodious building, specially designed and furnished with all the newest appliances, at St. Swithin's. An unlucky patron that for a photographer to choose! But perhaps our friends hoped thus to propitiate the saint and induce the "clerk of the weather office" to look upon their operations with a favourable eye.

On entering the works by the large gate the visitor has on his left the carbon printing and enlarging department, on his right the silver printing department, and behind him the main building, where the pictures are finished, stored, published, and packed.

Turning towards the left, we first enter a long, narrow building devoted to carbon work, consisting of one apartment, which serves as a *camera obscura*, and two developing-rooms. The firm holds a Lambert license, and the secrets of that dark room I may not divulge. Beyond the enlarging-room is a tool-house and carpenter's bench. Turning towards the opposite side of the yard we see a paved space some seventy or eighty feet long and twenty wide, occupied by printing-stages; and as the patron saint is ruthless and begins to empty a few bucketfuls of rain upon his hapless *protégés*, the stages are run back under the shelter of a projecting glass roof. Along the back wall, about ten feet back from the stages, are ranged a row of presses each containing about a couple of thousand negatives. Passing through a swing door we enter another apartment about the same size as the printing place, viz., seventy feet by twenty feet. Another row of presses lines the side of the room next that which we have just left, and serves as the store place of the remainder of the thirty thousand negatives. On the opposite side there is a series of yellow windows, underneath which a long table runs, upon which the printing-frames are placed to be filled and emptied. Passing out of the filling-room by a door at the west end we enter the washing-room, along one side of which is placed series of self-emptying washing troughs, furnished with hot and cold spray taps; on the other side is a row of sinks also furnished with both hot and cold taps. Near the door of exit is a small room sacred to "hypo." The upper floor is occupied by drying-racks, except one part, where magic lantern slides and stereoscopic transparencies are made.

The front house is a three-story building. On the ground floor, facing the street, is the wholesale department and the office. Behind are the furnace-room (from which both houses are heated by hot water pipes), the packing-room, the silvering-room, and the chemical

store-room. On the next floor is the large room in which the pictures are trimmed, mounted, and pressed. In a smaller room they are spotted, and in yet another the artists may be seen working up enlargements in black and white, or colouring them in oil or water-colours.

In one capacity or another the establishment furnishes employment to forty or fifty assistants, male and female; and the quality of the work produced is too well known to require further comment from

A CITIZEN OF BON-ACCORD.

Our Editorial Table.

THE ART OF RETOUCHING. By BURROWS AND COLTON. London: MARION AND CO.

THERE are some books of which no photographer who aspires to keep a foremost position in his profession can afford to be deprived, and this is emphatically true of the volume now under notice. On the ethics of retouching we need not here enter—it is one of those subjects on which scientific photographers may entertain a difference of opinion; but, whatever may be its abstract merit or demerit as an adjunct to the science of photography, there is no doubt whatever that retouching has become an art, and an art of great importance as applied to the production and finishing of photographic portraits.

Retouching is not only legitimate, but most necessary and praiseworthy, when it is confined to supplying such shortcomings as those from which photography, unfortunately, possesses no immunity. Wrinkles *will* persist in making their appearance on the negative with a potentiality which sets nature at defiance; freckles which in the fair face of beauty can barely be seen are shown in the more than truth-telling photograph as black spots; and defects of manipulation in the form of mechanical blemishes *will* come in an otherwise excellent negative, no matter what may be the amount of painstaking care displayed by the operator. To remove blemishes, to lighten shadows, to cause black freckles to depart, and to work such a marvellous change in the hard, dark, furrowed wrinkles of the negative pure and simple as to bring back the semblance of nature—to do all this, we say, is not merely legitimate, but most necessary and praiseworthy. If a person possessing red hair and beard have these hirsute appendages represented by intense blackness such a representation points most glaringly to the defects of photography, and its inability to represent tints or colours truthfully. From such delineation judicious retouching removes the reproach, thus permitting photography to conform more strictly to nature.

Having intimated in what direction retouching is legitimate, we have only further to observe that it is illegitimate when it is applied to convert a rough, weather-beaten face into one of wax-like smoothness; when it is made the means of snubbing a nose of Roman type, or of converting into a *retroussé* an unmistakable beak.

"'Tis well to have a giant's strength," however; and in their new work Messrs. Burrows and Colton most certainly do confer upon their readers a very great amount of artistic strength. In this goodly and elegant volume they take the reader by the hand and step by step initiate him into all the mysteries of retouching. A perusal of the instructions given makes good the claim advanced in the Introduction:—"By following carefully the rules we lay down, results may be obtained, with practice, in a short space of time which would otherwise take the learner perhaps months to master."

The opening chapter is devoted to a consideration of the nature and selection of the materials required in order to the effective retouching of negatives, and we are enlightened as to the various methods best adapted for giving the varnished surface of the negative an adequate "tooth" with which to bite the pencil. The selection and treatment of the pencil, too, are not considered to be unworthy of a few directions, which are of the most practical character. The lighting, the magnifier, and the desk all in turn afford themes for dissertations in which terseness of expression forms a not unimportant feature.

The second chapter is devoted to the *requirements of retouching;* and in this the authors dwell with some minuteness upon the nature of the work required to be done, very wisely taking it for granted that their pupil is entirely ignorant of retouching except what he is to learn from these lessons. From this chapter we quote a few valuable sentences:—

"Nothing is more annoying to a photographer than to produce a faultless negative (chemically and artistically speaking) and have it completely ruined by the retoucher, who, without regard to expression, &c., aims simply at making the negative perfectly smooth or fine. He obliterates all trace of character by so doing, and generally treats all faces of either sex, young or old, in precisely the same manner; instead of which it should be his endeavour to improve and retain the peculiarities which he has removed, and not work a face of a man of sixty as delicately as that of a schoolboy. As he progresses, bearing in mind the hints we give him, he will soon discover the means of doing this. He will learn to make with facility any alteration that taste may suggest, such as the fixed, staring, and unnatural look which so many persons assume while sitting for a portrait into an easy, natural smile; or to change the forced, sinister smile assumed under the same conditions into a calm and pleasing expression."

From the same chapter we learn that the practice of under-developing negatives—which practice is very prevalent among photographers—tends much to increase the labour of the retoucher. The development, we are told, should be carried on until the details are all *well* out; and in very freckled faces it may be carried much farther than usual.

A chapter devoted to the face, the hands, drapery, &c., is one of very great importance, and is illustrated by four fine full-page lithographic drawings, from which the name and position of every facial muscle may be readily acquired, owing to the system of lettering and indication lines adopted. The way having been thus cleared we are treated to a select course of lessons on the various methods of retouching employed by the best artists in this country and on the continent. This and the preceding chapter are exceptionally valuable.

Rembrandt portraits, as might have been anticipated, secure a large share of attention; and, what we believe will be highly appreciated by many, *landscape* negatives are not permitted to remain unnoticed.

The concluding chapter is devoted to the details of enamelling prints, intensifying negatives, spotting prints, and to the composition and use of encaustic paste.

The value of this book to the practical photographer cannot be over-estimated, and this value is enhanced by the adoption of a feature of novelty, viz., the presenting with each copy a double pellicular negative, one of the figures having been "retouched," the other not worked upon. This negative is enclosed in an envelope bound up in the book, and when removed and used in the production of prints it serves to *illustrate* the advantages of judicious and proper retouching.

We may remark, in conclusion, that the work forms an elegant volume, and is beautifully printed upon toned paper.

Meetings of Societies.

LIVERPOOL AMATEUR PHOTOGRAPHIC ASSOCIATION.

THE monthly meeting of this Association was held on Thursday evening, the 26th ult., at the Free Library, William Brown-street,—the President, Mr. W. Atkins, in the chair.

The minutes of the previous meeting were read and confirmed, and Mr. T. Bruce and Mr. E. Shannon were elected members of the Association.

The Rev. H. J. Palmer showed a number of portraits taken with gelatine plates, which were exceedingly successful.

Mr. W. H. KIRKBY said that he had made some further experiments with wet emulsion plates, using as a preservative albumen and glycerine. The plates, which he handed round, had been kept eleven hours between the time of preparation and development. The exposure was half-a-minute, being the same as he should have given with a wet plate with the same stop. There was no difficulty in the development, and no stains or drying marks, the plates keeping moist.

Mr. WHARMBY had noticed that some complaints had been made in the photographic journals about the deficiency of half-tone and density in the emulsion process. He found no difficulty in obtaining both half-tone and density, and handed round a number of negatives showing no want of either.

Some negatives produced by the Rev. Canon Beechey's process were also exhibited, and pronounced by the President to be very satisfactory.

Mr. J. H. T. ELLERBECK showed some transparencies toned with chloride of palladium. He, however, thought it an expensive method of toning, owing to the quick decomposition of the palladium. He (Mr. Ellerbeck) also alluded to the advantages gained by using an actinometer during the exposure of dry plates, and stated that he found in taking a view of a dark glen that it took fifteen times as long to give one tint of the actinometer there than it did in the open, and by giving that difference to the dry plate he found he had given the right exposure, while if he had only guessed the strength of the light the plate would have been much under-exposed.

Some fine examples of burnt-in photo-enamels were exhibited. These had been kindly lent by Mr. W. T. Watson, of Hull.

The SECRETARY gave a description of the method by which these enamels were produced, and advocated their production for the decora-

tion of vases, &c., in preference to the fancy portraits generally used for their ornamentation. If such fancy prices were paid for an old china plate how much more valuable a plate or china ornament ought to be if it had on it a family portrait or a favourite view or residence! That these could be obtained in that form the excellent examples before them would show.

The meeting was shortly afterwards adjourned.

Correspondence.

EMULSIONS AND BATH PLATES.—PHOTOGRAPHY AND ITS DANGERS.—ANSWER TO THE "PERIPATETIC PHOTOGRAPHER."—ON THE PREPARATION OF NITRATE OF SILVER FROM RESIDUES.—A DISCOVERY, OR AT LEAST A STRANGE PHENOMENON.—A NEW AND NOVEL METHOD OF CONVERTING CHLORIDE INTO NITRATE WITHOUT MELTING IN A CRUCIBLE.

AFTER a very long silence I have once more the honour to communicate with the sympathising readers of THE BRITISH JOURNAL OF PHOTOGRAPHY. During my prolonged absence from Paris I visited many photographers and amateurs in England, whom I thank most sincerely for their kind reception and for the liberal manner in which they opened their books of formulæ for my inspection, as well as their endeavours to point out the secrets of the long-discussed emulsion system. Alas! I am not yet convinced that emulsions are better than bath plates, and that they will ere long supersede wet plates in photographic studios, as many writers maintain. It is true the rapidity with which the plates can be prepared is a great advantage; but will that advantage counterbalance the fineness of the film and the rapidity which can be obtained by a properly-prepared bath plate? That is the question I am unable to solve. I brought with me to Paris several bottles of emulsion made by the best manipulators in England, but upon trial they did not give such good results as was hoped—in fact, no better nor worse than emulsions made in the ordinary way in Paris.

Why have we to mourn the loss of many who would have rendered still greater service to our art had they not been cut off in the prime of their lives? In many cases it is because they have been poisoned, having paid too little attention to the ventilation of their dark room and laboratory. The business of the photographer presents many dangers, the more to be feared because they are invisible.

Photography being a new art, naturally those who begun it, if not ignorant of its dangers were, at least, indifferent to them. They had not, as we have, so many proofs of the perils to be encountered. A cry of alarm must now be raised, for we have too many examples before our eyes. The pioneers of photography have been "called away" too suddenly; the many and untimely deaths, lately, among the profession, and the number of operators with whom I am acquainted who are suffering from a slow but sure disease brought on by the exercise of their profession, make it a duty to inquire into such a state of things and call upon photographers to beware, and to warn them of the precipice to which they are approaching ere it be too late.

One of the principal causes of this condition of ill-health arises from the dark room being too often encumbered with bottles containing divers chemicals, some of which, being very volatile, escape into the air and contaminate it. When collodion is poured upon the plate great evaporation takes place, and this, dangerous enough in itself, mixing with the other vapours forms poisonous combinations, which would soon overcome anyone unaccustomed to such noxious exhalations, but which appear to have very little effect upon the operator himself; still in truth he is being poisoned by slow degrees, the terrible effect of which declares itself after many months—sometimes after many years—first, by a headache, afterwards by a strange and unnatural excitement—fits of anger, then of sadness, followed by disease in the stomach, and chest diseases frequently supervene and complicate the injury already done.

I myself can give words of warning and advice, suffering as I do from inattention to the dangers to be encountered in a badly-organised laboratory; and if a few particulars of the manner in which I ruined my health will prove a warning to others I shall be but too happy to have aided in removing the great stumbling-block in connection with the profession.

Paris—the birthplace, as it were, of photography—is one of the worst places to carry on that business in a healthy manner and in commodious premises. House rent being fearfully high poor photographers are obliged to take their lodgings on the tops of houses, where they are oppressed by heat in summer and almost frozen in winter. The construction of Parisian houses, moreover, prevents proper ventilation, and the photographer has much difficulty in preventing the smell of ether penetrating the whole house, which would soon cause him to be expelled by the landlord, who would prefer to give warning to a troublesome tenant rather than run the risk of losing twelve or fourteen families paying higher rents. At the commencement of my photographic career I dwelt in such a house, and had the greatest difficulty in preventing the emanations from my laboratory and the vapour of ether from my dark room from flowing down the staircase. The windows of the flat or floor upon which I dwelt being at least a yard above the floor it was impossible to create ventilation by their aid. The walls being built of stone about half-a-yard thick no aperture could be made. At that time I employed about two quarts of collodion during the evening, and the smell of ether, &c., being continually complained of I was obliged to plaster up the lower part of the door in order to imprison the vapour of ether in the dark room, untill it rose sufficiently high to flow out of the window. I worked for several months up to the waist, as it were, in an ether bath, and from that time I felt in a low way, and to the present day my health has remained in a shattered condition. Had I not taken the advice of many friends and removed from that house I am certain I should not be here today to tell the tale, and warn my readers against such imprudence.

If the following rules be followed no harm can arise:—

1. Never encumber the dark room with any chemicals not absolutely necessary for the production of the negative.

2. Never employ cyanide of potassium upon any consideration whatever.

3. Have the dark room, if possible, above the ground floor, in order that a hole can be made in the floor to let off the ether and alcoholic vapours. An iron grating can be adjusted, and a means to prevent light from entering easily contrived. If it be impossible to obtain ventilation in that manner the system I employ at present, and which I described in a former communication to THE BRITISH JOURNAL OF PHOTOGRAPHY (No. 773, vol. xxii, page 106), will be found upon trial to answer the purpose very well.

4. Never drink spirituous liquors, for too much has already been absorbed during the day's work.

In following out these simple rules, and by taking very much exercise after the labours of the day, health will be secured, doctors' bills spared, and happiness enter your abode; for without health all worldly good is devoid of enjoyment. Health is a blessing more especially appreciated by those who are on the point of losing it.

Having just returned to Paris the demand of my colleague, the "Peripatetic Photographer," in THE BRITISH JOURNAL OF PHOTOGRAPHY for September 1st, has just caught my eye. Had I not also seen in another number of the Journal that M. Vidal had taken the hint and forwarded some specimens to the Editors' office, I should have been but too happy to have paid a visit to that gentleman, and solicited a certain number for the inspection of your readers; but I have been forestalled by M. Vidal himself. All that I can say is that I am much pleased to see that my colleague, as well as the Editors, are contented with his productions—the one saying that they are "wonderful," the others that they are "exceedingly fine and brilliant." It is, indeed, very gratifying to me to read of the success of M. Vidal, and I hope that the general public will appreciate his endeavour to place works of art within the reach of the masses.

A belief exists here that good nitrate of silver cannot be made from silver produced from photographic residues. Not only photographers, but even chemical dealers, sell silver so produced at a low price and purchase refined silver, thereby causing a considerable loss. To convince myself of the truth of this impression I made the following experiments:—

I converted all my residues into pure chloride of silver, and then divided it into two equal parts. One part was mixed with pulverised chalk seventy per cent., and pulverised charcoal four per cent. This was put into a furnace and melted; the ingot was dissolved in pure nitric acid and distilled water; the product was crystallised. Three parts gave very good nitrate, and the fourth part was set aside for future experiment in connection with its purification.

The second part was placed in a high, narrow vessel, on the bottom of which was a large zinc plate; water acidulated with hydrochloric acid was added, and the vessel allowed to stand a day or two, so that all the chloride of silver might be converted into metallic silver. When this was obtained what remained of the zinc plate was taken out, and the product well washed. Hydrochloric acid was then added to

dissolve out any zinc which might have remained. After many washings the product was dried and melted in a crucible; the ingot was dissolved in pure nitric acid and gave, as in the first instance, very good nitrate after the second or third crystallisation; but the remainder became more and more unfit for photographic purposes.

The two impure solutions which remained were placed in a porcelain pan and evaporated to dryness without any crystallisation, and then fused pretty strongly. In order not to lose time by waiting until it became cold the idea occurred to me to pour the silver, while at a fused heat, into distilled water, when, behold! I obtained the most extraordinary precipitate I ever beheld. The solution on being filtered gave a perfectly limpid, transparent liquid which crystallised nearly to the very last grain. Now, whether this is a discovery that will be of value in photography I am at present unable to say. The phenomenon is in itself strange; for when I poured distilled water upon the fused nitrate, when cold, and filtered the solution, little or nothing could be found upon the filter, whereas by pouring it when hot into distilled water I obtained several grains of residue. If our negative baths could be clarified simply by evaporating them, fusing the product, and pouring it, when hot, into distilled water, how easy would it be to keep the bath in working order! Such was the train of thought which rapidly passsed through my mind. But of what, it may be asked, was composed the residue found upon the filter? The following experiments were made:—

1. A small quantity of residue was placed in a glass tube with nitric acid, and, although boiled over a Bunsen burner, it was not dissolved. The liquid was decanted into distilled water; hydrochloric acid gave a very faint trace of silver.

2. Another small quantity was placed in the tube with sulphuric acid; upon the addition of water and hydrochloric acid a precipitate of chloride of silver was obtained.

3. Another small quantity was put into the tube with ammonia; the solution being acidified with hydrychloric acid chloride of silver was obtained.

But in neither of the two last experiments was the residue completely dissolved. To the undissolved part sulphuric acid was added, and after much difficulty all was dissolved.

I have therefore every reason to believe that a double salt of silver is present in ingots made from photographic residues, and that the presence of this double salt has an injurious effect in the negative bath. I have no doubt whatever that it can be eliminated by care in the manner I have described, and thus a great saving will be effected by photographers.

A New and Better Means of Converting Pure Chloride of Silver into the Metallic State.—This was my second experiment. I employed a thick zinc plate, which was placed among the chloride; since that experiment I have changed the system, because I found it impossible to obtain a pure product by the use of common zinc, and pure or distilled zinc is too expensive for the purpose. I employ ordinary zinc which contains other metals, upon some of which the hydrochloric acids has no solvent power. When the acid attacks the zinc these metals fall down among the silver, and, when the latter is melted, enter into combination with it.

To obtain pure silver procure a porous earthenware tube, such as are used in galvanic batteries; make a zinc cylinder to enter it, leaving a small space around it. To the zinc cylinder must be soldered a piece of silver wire. A cork can be placed in the top of the tube to keep the zinc in its place, and wax poured over it to keep out the liquid. The chloride to be converted is placed in a large jar no more than half way up. The porous earthenware vessel is made to stand upon the surface of the chloride, and the silver wire is curved so that it can pass through the middle of the chloride. The jar is then filled with acidulated water, which, passing through the pores of the tube, attacks the zinc and creates an electrical current. The silver in a pure metallic state deposits itself round the silver wire.

The jar must be kept in a warm place, and not touched until every atom of the chloride is converted. When terminated it is not even necessary to melt the product in a crucible; it can be dissolved in nitric acid and crystallised. E. STEBBING, *Prof.*

3, *Place Bréda, Paris, October* 31, 1876.

LIGHTING AND PRESERVATIVES.

To the EDITORS.

GENTLEMEN,—Your leader of last week was very much to the point, for it is impossible to be sure of doing the best you can for a negative unless you have a really good light upon it. Daylight is troublesome on account of its continual variations necessitating the drawing and undrawing of curtains, not to mention the great darkness you have to submit to to be sure of excluding active rays from delicate work, so I tried to find some artificial light. I should have liked a sodaic flame, but could not hit upon or find described a sufficiently simple plan.

I now use a sponge lamp with the globe varnished with a varnish stained with turmeric. I put it on a little bracket about a foot above and beyond the plate developing, and find that though the light is all that can be desired—being strong enough to see the minutest details as they appear—I never get fog from that cause. I use a sponge lamp because it is cheap, clean, convenient, and being a small and not very hot flame it does not crack the varnish. This hint may be useful to those working very sensitive bromide films.

I have been experimenting with different preservatives for gelatine, and so far find quinine the best. In trying the properties of Iceland moss I found that if carefully filtered and thinly spread it makes glass appear as if *very* finely ground—finer than any I have ever seen.—I am, yours, &c., JNO. W. NEWALL.

United University Club, Pall Mall East, S. W., October 30, 1876.

THE OXYGEN MACHINE.

To the EDITORS.

GENTLEMEN,—I have obtained Mr. David Young's specification, and I am surprised to find he claims the stage, over the retorts, for putting his lantern on.

My oxygen machine has a stage for the same purpose, and at a meeting of the Manchester Photographic Society, early in 1875, I had a double story'd lantern on it, and had an argument with Mr. Atherton, who said the stage was not firm enough. There was some elasticity about it, but the remedy was easy.

Now, for the future all "lanterns" (the *City Lantern* excepted!) must "keep away" from my stage; but, to stop any further nonsense, I now claim the free use of the stage for all other purposes whatsoever—in chemistry, electricity, mechanics, and the blowpipe—to be open to every one. This brings me to a question which I think should be settled now, for the good of all scientific societies.

I want to know if, at the meetings of the Manchester Photographic Society, all the sayings, doings, demonstrations, exhibitions, experiments, &c., &c., are to be considered private that are not reported and published in the Journal. If this be so, then every one wishing to retain his priority in any subject, must be his own reporter, get it into the Journal first, and then he may offer it at the next meeting, perhaps to be met with the exclamation—"Oh, it's too late now; it is not courteous to bring a second-hand article before the members!"

Well, I may be mistaken, but I think there is a sufficient amount of publicity in the proceedings of the Society, whether reported or not, to make it unsafe for any one to exhibit anything he wishes to secure to himself commercially. The reason why I think so is this:—We have had exhibitions in Manchester where it has been ordered by government that exhibitors may show their inventions without prejudice to their afterwards taking a patent. At these exhibitions the public had to pay for admission, but for all that an especial privilege had to be obtained to defend the exhibitors against the public, and I want to know how far that is applicable to our case.—I am, yours, &c., M. NOTON.

Manchester, October 30, 1876.

ALLEGED EMBEZZLEMENT BY A PHOTOGRAPHIC ASSISTANT.—Walter Allen, a respectable-looking young man, late travelling assistant to Mr. Nichols, photographer, of Station-road, Hitchin, was recently charged with embezzlement. Mr. Horace Barker defended the prisoner. Mrs. Nichols, wife of the prosecutor, said she managed the business for her husband. Allen had been in her employ and used to travel in the country to take negatives, which he was supposed to bring home to be printed off. He used to receive money for them, and if he did not come home the same night it was his duty to send it by the boy, who returned every night. On the 11th August he did not come home, but did on the 12th, which was Saturday. He always came home once a week to book all orders received. He had come from Clifton, where he had been at work. On the Saturday he brought home £7 5s. He settled up accounts with the young-lady clerk. After the examination of several witnesses Mr. Barker submitted that mere neglect to account for money received was not sufficient to prove embezzlement. Felonious intention, running away, or denying the receipt of the money, secrecy or concealment, were absent in the case before the bench. An excuse at once, no matter how frivolous the excuse might be, overthrew such a case. There were no grounds for sending the prisoner for trial. If there had been no dispute it might have been different, but here there was a dispute. The prosecutor would have had prisoner back. Prisoner never denied taking the money. A jury would never convict him upon the charge. A remand was ordered till the following (Wednesday) morning. On the resumption of the case next morning Mr. Neale, carpenter, of Clifton, said on the 12th inst. he left six shillings with his

master, Mr. Woollatt, to pay to Allen, as witness believed, for Mr. Nichols. In cross examination witness said that prisoner did not say he was working for himself; he said he was going to leave and work for himself. Mr. Barker submitted that the bench had no jurisdiction, as the case should be heard where the offence was committed. The bench thought there was a *prima facie* case against the prisoner, and committed him for trial at the next quarter sessions, which take place on the 1st January, 1877. Bail, as before, was allowed.—*Hertfordshire Express.*

EXCHANGE COLUMN.

Nine dozen stereoscopic and fifty dozen quarter-plate negative glass, unused, is offered in exchange for a good quarter-plate lens or other requisites.—Address, R. Iliffe, Hinckley.

A new brass-bound, quarter-plate camera, swing back, three double dark slides, one single for wet plates, shutters drawing downwards, with Grubb's aplanatic lens of six inches focus, portable folding zinc tent box, which holds the whole of the above while travelling, and forms an oven for heating dry plates, will be exchanged for a 12 × 10 or 9 × 7 brass-bound folding camera, with three double dark slides and one slide for wet plates, with stand.—Address, W. Mackay, 2, Glasgow-street, Helensburgh, N.B.

ANSWERS TO CORRESPONDENTS.

☞ *Correspondents should never write on both sides of the paper.*

*** The pressure on our columns this week compels us to leave over several articles—among them being notices of pictures by Mr. Faulkner, Mr. Cole, and other "Editorial Table" matter; a portion of "Notes on Passing Events;" "Noctes Washingtonia," No. IV.; and articles by Mr. A. H. Wall, Mr. G. W. Webster, &c.

S. P. (Chester).—Publication need not be delayed.

B. W. A.—We fear your difficulty, like the gelatine, is quite insoluble.

George Robarts.—Both are so nearly alike as to render it a matter of indifference which you select.

J. Heywood.—An application of tincture of iodine, followed by a solution of cyanide of potassium, will effect the removal of the stain.

C. Adair.—To a solution of chloride of gold add as much prepared chalk as will neutralise it, and it may be used without any further addition.

Sara A. Powell.—From one to six guineas a-week, according to ability. The rate of remuneration depends entirely upon the skill of the artist.

Erratum.—In Mr. Smith's letter in last number he is made to speak of moistening the surface of the plate at the top. For "top" *read* "tap."

J. E. F.—It is probable that the comets will disappear after the collodion has been allowed to stand for one or two weeks. It may, however, be advisable, in the meantime, to filter it carefully.

Troubled Photo.—We advise you to keep the roof more than eighteen inches lower than is shown in the sketch. There is no advantage whatever to be secured by having the roof of a studio of so great a height.

S. S. B. (Leeds).—If you have correctly described the implement it is a writing diamond—an instrument used for writing on glass, especially on the slides of microscopic objects. When new they cost from five to six shillings.

G. P. B.—To test the value of your preservative prepare two plates, wash both thoroughly, and apply the preservative to one of them only. After both have been dried expose, develope, and note the points of difference between them.

The Howarth Stove Company.—A. L. B. inquires—"Can any of your readers inform me of the present address of the 'Howarth Stove Company,' a letter addressed by me to 'Lister Hills, Bradford,' having been returned through the post?"

X. Y. Z.—Try the effect of increasing the proportion of the iodiser, and if this do not answer obtain some collodion that has already been properly iodised. The specimen enclosed is very well executed, although the vignetting is a little too harsh and abrupt.

J. S. (Heaton Mersey).—Of course the back lenses of a portrait combination must be separated; but to what extent we know not, this being dependent upon various circumstances. A few trials with the foreign lens in your possession, and a comparison of the various effects produced under varying degrees of separation, will at once settle the question.

The Parson.—Although the globe lenses at the time of their introduction included the largest angle of view of any lens that had been constructed up to the advent of these instruments, yet they were very soon surpassed by the productions of English manufacturers, whose lenses included a wider angle and gave more brilliant pictures with a larger aperture, and, consequently, with a shorter exposure.

W. M. writes as follows:—"Mr. Woodbury states, in his tour to Italy with emulsion plates, that he transferred the films to transfer paper, and again back to glass for printing purposes at home on his return. For amateurs it would be valuable if the film could be transferred to a support of a transparent kind and remain there, as they rarely want more than ten or twelve prints from their negatives. The image would, no doubt, be reversed, but if the support were thin the negative might be printed *through* it and appear quite sharp. Can films of transparent gelatine be bought for the purpose anywhere? or, perhaps, mica would suit my case, as I only want quarter-plate size. I fear in the *moist heat* of Bengal that gelatine would become a fungus in a month."——Our correspondent will find, in an article by "L. S. D." in the present number of this Journal, information which will prove of material service to him. The transferred film, to which we make reference in a footnote, being attached to very thin and translucent paper, will give prints of a sufficient degree of sharpness even if the back of the negative be placed next to the sensitive paper in the printing-frame.

Saxon.—The diagram is exceedingly confusing owing to the number of lines which cross and recross each other. Send us another diagram, confining your representations of the rays of light to two central and two oblique lines. This will answer quite as well, and be more easily understood.

West Riding of Yorkshire Photographic Society.—The annual *conversazione* of this Society will be held on Wednesday, the 22nd inst., at the Belle Vue Hotel, Manningham-lane, Bradford.

Soirée of the Photographic Society of Great Britain.—On Tuesday evening, as announced, a *soirée* was held in the Exhibition Gallery. It was well attended, there being a goodly representation of the fair sex. There were also present several gentlemen of eminence in the world of science. The visitors were received by Mr. Glaisher, F.R.S., President, Mr. Spiller, F.C.S., Vice-President, and other officials. Altogether the meeting proved a very pleasant gathering.

Ancient Charters.—The *Athenæum* states that the second series of *Facsimiles of Ancient Charters*, in the British Museum, edited by Mr. Bond under the direction of the Trustees, is just about to be issued. It contains a number of specimens of charters of the Saxon period, and is one of the most important publications connected with English palæography and history. The plates have been printed by the permanent process of the Autotype Company, and are in each case accompanied with verbatim transcripts in letterpress.

Safety Dippers.—Samples of these safety dippers have been sent to us by Messrs. Harvey, Reynolds and Co., of Leeds, the manufacturers. The speciality in their construction lies in their clamping a plate of any dimensions, and this with so much firmness that it is possible to turn a plate without its falling off. This is very convenient, inasmuch as it permits a plate to be immersed in the bath with its face downwards. We believe that these "safety dippers" are calculated to be very useful from their lightness, rigidity, and not being affected by, or affecting, the silver bath.

South London Photographic Society.—We call attention to the most important meeting of this Society during the year, viz., the Technical Exhibition, which will be held on Thursday next, the 9th inst., at the House of the Society of Arts, Adelphi, commencing at seven o'clock. The annual dinner will also take place on Saturday, the 11th inst., at Anderton's hotel, Fleet-street, thus affording an opportunity to friends from the country who attend the "Technical" meeting also to be present at the dinner. Particulars can be obtained from the Hon. Sec., Mr. Edwin Cocking, 57, Queen's-road, Peckham.

Cloud Photographs.—Messrs. Bourne and Shepherd, the well-known Indian photographers, are said to be engaged upon a new and interesting work, which may prove of especial importance to artists:—"They are photographing the various forms of Oriental cloud-cumuli, which, especially about the monsoon times, are particularly fine in contour and proportion. In England we rarely know what a *mass* of clouds appears like when distinct and clearly outlined against a calm sky, except now and then, when a sudden first burst of an equinoctial gale drives up precipitately a bank of these over the western horizon, when all the zenith is blue and all the east is basking in quiet sunshine. The cloud-forms of the tropics are particularly grand, and if well reproduced will greatly interest observers of nature. It is too much to expect, however, that the cloud-embankments, which often appear with inexpressible grandeur at the bursting of a cyclone, will be caught by the camera."

METEOROLOGICAL REPORT,

For two Weeks ending November 1, 1876.

Observations taken at 406, Strand, by J. H. Steward, Optician.

These Observations are Taken at 8 a.m.

Oct.	Bar.	Wind.	Wet Bulb.	Dry Bulb.	Max. Tem.	Min. Tem.	Remarks
19	29·79	E	54	53	68	53	Foggy
20	30·00	E	53	56	59	53	Dull
21	30·05	E	45	49	53	47	Dull
23	30·08	E	45	46	50	45	Raining
24	30·15	NE	45	47	51	45	Foggy
25	30·35	NW	40	40	—	39	Foggy
26	30·34	SE	48	51	55	39	Foggy
27	30·29	SE	45	49	51	47	Foggy
28	30·28	E	46	49	53	47	Hazy
30	30·20	NW	45	47	57	43	Fine
31	30·24	N	35	39	47	37	Fine
Nov. 1	30·33	N	35	39	—	35	Fine

CONTENTS

THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 862. Vol. XXIII.—NOVEMBER 10, 1876.

ON THE LIGHT EMPLOYED IN PHOTOGRAPHIC OPERATIONS.

In an article published a fortnight ago we dwelt upon the importance of the entire absence of all influences tending to induce fog during the preparation and development of the photographic film, and in our last week's number a correspondent, Mr. J. W. Newall, reverts to that portion of the subject connected with the light employed during the time occupied by those operations. We think the question is of sufficient moment to warrant us in dealing with it further; for, though it may be urged that it is a matter of no difficulty to fit up a suitable and perhaps nearly perfect system of lighting in the work-room, it unfortunately happens that the inconvenience is most frequently experienced at the time and under circumstances where the remedy is most difficult of application, as, for instance, when travelling. We shall, then, endeavour to give our readers a few hints which may enable them to be prepared for any difficulties which may be encountered.

We will first consider the requirements necessary to form the most perfect light—or, rather, system of lighting—in the regular laboratory or dark room. The first of these is, of course, entire exclusion of all actinic rays, after which we require as great a quantity of the luminous rays as will enable us to see clearly and with ease, not only the progress of a plate under development, but also the surroundings of the room. If the latter be not attended to considerable inconvenience will frequently arise from the necessity of striking a light in order to find some bottle or other article which is probably stowed away in an obscure corner into which the non-actinic "light" fails to penetrate. Further: it is desirable that the light be cheap, clean, easily managed, and ready for use at all times. How far these objects are attained by the various methods now in use we shall proceed to consider.

First, we will notice the suggestion of our correspondent of last week to use the monochromatic soda-flame. This is a very old idea, and would, no doubt, prove quite effective were it possible to secure, at a small cost and with the expenditure of a moderate amount of trouble, a light of this description which might be depended upon for steadiness and uniformity of working; but, unfortunately, no such desirable combination of qualities has yet been found. The simplest method we have tried is the one described nearly two years ago by Professor Stebbing, in which a few lumps of dried chloride of sodium are suspended in a small wire basket over a Bunsen's burner, the intense heat of which acting upon the salt produces a flame possessing considerable illuminating power and at a very small cost. The objections to this method are, first of all, the unsteadiness of the flame, which flickers in such a manner, and burns so irregularly, as to render it, if not a matter of impossibility, at least a painful operation, to carry out the development of a plate. In addition to this the salt "spits" and splutters about the place in a manner not at all conducive to cleanliness and good results, while at times the light is sufficiently powerful actinicly to produce a very distinct image upon a sensitive plate with a comparatively brief exposure. Such were our reasons for relinquishing the soda-flame.

Passing on to other forms of illumination, they may be divided into two principal classes, dependent upon the use of natural and artificial light respectively. Where circumstances permit, it is of course, better on many accounts to employ the former, but chiefly because it costs nothing, and even in our uncertain climate, is always present in sufficient force for the purpose in question. In connection with daylight we have then only to consider the various non-actinic media which are employed to arrest the active rays—a matter which until comparatively recent times received a very inadequate amount of attention. It has frequently been a complaint with photographers that, without any apparent reason, the whole of their work at times goes wrong, and no amount of "doctoring" of baths and chemicals is of any use in mitigating the evil, when finally, presto! all is right again as if nothing had happened. It may have been remarked, too, that these unpleasant occurrences happen just on one of the unlucky photographer's busiest days, when the brightness of the sun and clearness of the atmosphere bring sitters out in shoals—the babies, of course, being in at least their due proportion. We can pardon any man for using forcible language under such conditions, especially if the next day be dull enough to keep his studio empty, and he finds his chemicals are in perfect condition.

It perhaps never strikes the bewildered artist—while casting base suspicion upon each separate item amongst his stock of chemicals, and getting nearer the mark, mentally aspersing the door of his dark room for admitting diffused light—to act justly and bestow on the window its fair amount of suspicion with the rest. "Oh dear, no! I have used the same window for many years, and have tested it by exposing a plate for several minutes to it; no, there's no fog *there*." Such, or something very similar, would in all probability be his reply to any suggestion that the window was to blame; but we would ask him—"Did you ever so test it with direct sunlight or the reflection from that wall falling upon it?" The answer, we are prepared to say, would be in the negative; for it is quite possible that a sample of glass which in a weak or ordinary diffused light stops the whole of the active rays may be found, when exposed to direct sunlight or even to a strong reflection from any adjacent wall or building, to permit a very large portion of the actinic rays to pass.

Orange glass, which was at one time considered sufficiently deep in colour, fails considerably in the above respect. Indeed, the only kind of glass for which any claim is made that it stands the action of direct sunlight is the dense "pot" ruby. This, however, is so dense that in a dull light it is almost impossible to work, so small is the quantity of even the luminous rays which pass. Many photographers get over this difficulty by using a thinner glass capable of resisting an ordinarily bright light and an addition in the shape of a blind of orange calico or paper for use under special circumstances. Another plan consists in fitting a sliding shutter to the window carrying glasses of different density, and so arranged that either may be immediately brought into position according to the quality of the light.

Many of our amateur readers will be chiefly concerned in the question of illumination by artificial light, as in numerous cases, no doubt, the greater portion of their work has to be performed after daylight has taken its departure. It is scarcely necessary to make any distinction between the various kinds of artificial light employed

for this purpose, as where gas is available that must inevitably carry the palm on account of its cheapness, cleanliness, and convenience. Failing that, however, a paraffine or even a small sponge lamp will be found generally preferable to anything in the shape of candles or vegetable oils. The sponge lamp, however (which we notice was recommended by Mr. Newall last week), gives so feeble a light that it is scarcely of much use except purely for the purposes of development, where the area of illumination required is but limited. Paraffine, on the contrary, gives a good light, capable of reaching to a considerable distance.

Of course in speaking of artificial light it is not to be inferred that the naked flame is to be employed; for, though infinitely more feeble as regards actinism, all the sources of illumination we have mentioned are capable of powerful action upon the sensitive film. Of the numerous media employed to obstruct the actinic rays coloured glass is undoubtedly the best and most convenient where it is to be used in its *flat* form. There is, however, no necessity whatever to use the ruby colour; on the contrary, with artificial light, it is objectionable on account of the extremely feeble nature of the illumination obtained with it. The ordinary orange glass answers perfectly all the purposes, even with the most sensitive films.

Circumstances frequently occur, however, when flat glass is inadmissible, or perhaps coloured glass of the right tint is not procurable; it then becomes necessary to resort to some means of producing a medium capable of transmitting the light rays only. Coloured paper forms a convenient and cheap substitute for glass when it can be procured of the proper colour; failing that, a common practice is to use a coloured varnish, which may be spread upon glass, paper, or cloth, as may be found most convenient.

Amongst the varnishes recommended for this purpose we may mention those coloured with iodine, turmeric, and aurine, which are formed by dissolving the respective colouring matters with ordinary negative varnish, and may be poured on a flat plate in the manner usual in varnishing a negative, or, in the case of curved surfaces, applied with a brush. The first mentioned is objectionable on the score of instability; for, though at first it gives an admirable colour, it fades in a very short time. Turmeric gives a good colour and plenty of light, and stands tolerably well; but by far the best is the last mentioned, prepared by adding sufficient aurine to the varnish, or even to collodion, to produce the required depth of tint. Where a flat surface only has to be dealt with probably collodion will be found the better vehicle.

The only objection to these varnishes is that they are liable to crack or blister under the action of heat. A substitute which will be found quite free from this defect consists in coating the glass, whether flat or curved, with a solution of plain gelatine, and drying. Or a sheet of thin paper (tissue or tracing paper) may be floated upon the gelatine. When quite dry the gelatine film is treated with a strong solution of permanganate of potash until the desired tint is developed. Very beautiful films may be obtained in this manner, and when once dried will be found unalterable by either heat or moisture.

Next week we propose to treat of the various forms of apparatus used in connection with lighting, both in the work-room and while travelling, and the manner of employing light to the best advantage. We shall also give one or two makeshift appliances which will be found useful in emergencies both at home and abroad.

THE PHOTOGRAPHIC EXHIBITION.

[Concluding Notice.]

Visitors to the Exhibition cannot avoid having their attention arrested by several enlargements hanging, not on the line, perhaps, but sufficiently contiguous to afford the spectator an opportunity of minutely inspecting their detail. They belong to the choice collection exhibited by the Woodbury Company—a series of pictures which, from their great excellence, challenge comparison with any others of a similar class as to sharpness and detail. We have often moralised over the importance of securing sharpness among the other attributes of a good negative. An examination of the Woodbury Company's enlargements will command appreciation of this valuable photographic quality from the most *exigeant* of critics. But this Company contribute two distinct classes of productions—enlargements and Woodburytypes. These we shall notice in their order. One of the most imposing pictures in the room adorns the centre of the west wall. It suggests the edifice reared in the "Dream of Sir Watkyn"—

"A castle high frowning,
The lofty rock crowning,
Dim twilight embrowning,
Hung over his head."

It is, however, not the pictorial representation of an aerial Welsh fortification that hangs before us, but that of a stronghold whose antitype is a solid edifice of stone and lime, namely, *Penha Castle, Cintra, Portugal* (56), from a negative by Mr. J. Stuart. When speaking, a few years ago, of the excellent qualities of a number of Spanish and Portugese views taken by Mr. Stuart during a photographic tour in the Peninsula, we directed attention to the fact that owing to the crispness of their detail they would produce enlargements of exception excellence. How correct was the surmise then hazarded the picture just named bears testimony. And yet it is quite equalled, if not excelled, by the *Court Yard, Alcazar, Seville* (88)—a picture replete with delicate ornamental architectural tracery, every detail, even in the deep shadows under the piazza, being well delineated. In this, as in the foregoing, Mr. Stuart's negatives have been admirably rendered. The charming negatives taken in Egypt by Captain Abney—*The Sanctuary, Karnak* (120), and *Karnak from the South East* (128)—have, in the hands of the Woodbury Company, furnished enlargements possessing singularly fine detail and qualities. Nor are the enlarged landscapes the only pictures of this class exhibited by the Company; for equally deserving of notice are a number of portraits produced at their extensive art-works. Of these nothing can surpass the fine portraits of *J. E. Millais, R.A.* (117); the *Hon. Eva Wellesley* (165)—the negative of which is by Messrs. Lock and Whitfield; and a characteristic portrait of *Cardinal Manning* (201). But there are also exhibited a number of portraits and landscapes printed by the Woodbury process, which, judging from these specimens, has now reached a very high degree of perfection. A series of portraits, entitled *Men of Mark* (143), of which we may hereafter have occasion to speak in detail, bear evidence of the beautiful results capable of being secured from this process when carried out efficiently. The adaptability of the Woodbury method for printing other subjects than portraits is shown by the lovely *Views of Thebes* (95), and other applications, including reproductions of engravings, which adorn one of the screens.

Mr. William Cobb contributes several very charming pictures, to some of which (his *Story of a Bird's Nest*) we have already directed attention in a previous notice. Mr. Cobb may with justice complain of the treatment several of his dainty pictorial gems have received at the hands of the hangers, one frame occupying a solitary position on the back of a screen and so placed as to preclude the possibility of daylight falling upon the frame, while numerous large pictures which might, without much detriment, have been hung in the shade have had prominent positions assigned to them. We are pleased to see an enlarged series of the "bird's nest" story. These are numbered 271 *et seq.*

Architectural photography finds in Messrs. A. and J. Bool very able exponents, their large picture of *Westminster Abbey* (258) being one of great merit, despite the cracking of the negative during printing—a mishap which has been very skilfully masked.

The composition picture of the *Holderness Hunt* (141), by Mr. George Cooper, is a work we noticed critically several months back.

The soft delicacy of the shadows and reflections in the contributions of Mr. George E. Dew are worthy of special notice. This artist contributes three pictures of nearly equal merit. His *Pleasant Nook on the Avon* (29) is a happy example of his artistic powers.

Mr. Adam Diston only contributes one picture this year, viz., *Evening Prayer* (278). While possessing strength we think it falls short of that displayed in those works which a few years ago won much fame for this artist.

An illustration of the possibility of obtaining all the necessary intensity, combined with full detail, when using the Liverpool emulsion is exhibited by Mr. A. Gil de Tegeda. The frame No. 300 contains ample evidence in support of this implied assertion.

A picture of a youth engaged in the schoolboy occupation of ciphering on a slate (168) favourably attests the artistic abilities of Mr. H. Gregson.

Those who desire to see what effects can be obtained on plates prepared with Kennett's gelatine pellicle can do so in the picture *A Country Cottage* (32), by Mr. J. D. Radcliffe; but it is desirable that Mr. Radcliffe should next year contribute a few pictures of larger dimensions by the same process.

The Poet's Retreat (227), by Mr. F. N. Broderick, is a brilliant, effective picture of a villa in the Isle of Wight.

The possibility of producing vigorous enlargements from paper negatives is proved by Mr. B. B. Turner, who exhibits a fine example of this class of work, *Hedgerow Trees* (135), from a paper negative.

The portraits of *Garibaldi* (320) and of *Professor Hoffman* (321), both by Mr. J. Spiller, are excellent mementoes of men of renown.

The large contribution of *cartes* and cabinets of *Artists in Armour* (263), by Mr. Rowland Taylor, while they unpleasantly attract attention from the fact of the whole of the heads being turned in one direction, afford at least examples of novelty.

The Exhibition will be closed on Monday next.

SINCE we wrote last week upon the subject of organifiers, we have noticed in connection with both tannin and gallic acid a property not hitherto credited to them. We have frequently spoken upon previous occasions of the value of colour as a test of working qualities in dried emulsion films, and have stated our opinion that richness of colour and fineness of deposit appear to go hand in hand. It will also be remembered by our readers that, in the earlier days of the washed emulsion process, tannin and gallic acid, amongst other substances, were added to the emulsion to give density, and it was found that an emulsion which, without this addition, worked unsatisfactorily in other respects besides density, gained considerably by the treatment. Our experience was as follows:—Having prepared a washed emulsion with an unsuitable sample of pyroxyline, we found that upon re-solution the bromide would scarcely keep in suspension for more than a few minutes, and the film it formed—if film it could be called—was entirely without body. A fresh quantity of pyroxyline was added, and for several days the deposit of silver bromide appeared to improve, but at last came to a standstill. At this stage the resulting film when dried was dead and dusty in appearance, and when viewed by transmitted light, though no absolute granularity was noticeable, the total absence of any tinge of orange in the film, which invariably accompanies a coarse deposit, told too plainly its characteristics. Upon development nothing but a weak and foggy image was obtained. To two separate portions of the emulsion—one grain per ounce of gallic acid and tannin—were added respectively, with no immediately apparent result. At the end, however, of some hours we were astonished to find the character of the emulsion entirely changed. The grey tinge of the dried film had given place to a warm orange, while the dusty appearance by reflected light was entirely gone, the emulsion treated with tannin appearing to have suffered the greatest change. When developed the image came out clear and vigorous, especially with tannin, in which case, however, a considerably longer exposure was necessary. The gallic acid, on the contrary, appeared rather to act as an accelerator. What may be the *rationale* of this action we must leave our readers to judge, but we offer the facts as one further proof that tannin and similar substances are capable of some specific action upon the silver haloids.

INDICATING MOTION PHOTOGRAPHICALLY.

I WAS not a little surprised, during the course of a conversation held a few days ago with a gentleman eminent in science and photography, and who has, perhaps, done more than any living man to perfect the stereoscope, to hear him say that he was beginning to think that, after all, it was just possible that the stereoscope was a mistake, and that it is probably almost as undesirable as it is unlikely that its popularity will ever be revived. He seemed to consider that the undoubtedly great popularity to which the instrument at one time attained arose in a great measure from the novelty of the effects produced, and that when such novelty had passed away and the instrument was required to be of some value in science it really turned out to be nothing more than a pleasing toy—a toy only pleasing when the requirements of the observer were very limited. For this opinion several good reasons were adduced; but I shall only notice one, and that because of the suggestion its consideration involved.

Although the stereoscope, when properly adjusted and supplied with suitable pictures properly mounted, undoubtedly and easily conveys the idea of solidity, it fails altogether to suggest the idea of motion, even when the pictures of moving bodies have been taken in a sufficiently brief period of time to admit of the image being tolerably sharp. That such is notably the case is capable of ample proof. If, for example, we place in the instrument any one of the many excellent so-called instantaneous street views, in which one foot of each of the passers-by is seen to be poised in the air, roundness and solidity are evident enough; but there is really nothing to suggest that the foot is about to come down to the ground—nothing, in fact, to indicate that the whole scene, poised feet included, has not been purposely arranged, and so disposed that any ordinary exposure might be given. The theory of my friend practically amounts to this, that to truly indicate motion three pictures are absolutely necessary—one showing the object at rest at the point of departure, one in transit or middle distance, and one at the point of final rest.

By way of illustration, suppose we wish to depict the falling of a "time ball" and with an exposure of the shortest possible fraction of a second produce a picture of the ball at the moment of its descent. A careful examination of the image will show that at the sides it is quite sharp, as the actual quantity of motion during the the time of exposure has been, so to speak, in a line; but at the upper and lower sides, where the ball has more visibly changed its position, it is considerably blurred and indistinct. If such a picture be placed in the stereoscope its roundness is at once made evident; but the fact that it was in motion is hardly indicated, or if any such idea is suggested it is only as the result of external knowledge. If, however, instead of two pictures taken of the ball at different angles, but at the same period of time, three single pictures are produced—one before the descent began, one in the middle of the descent, and one after it had fallen—and these be mounted side by side, the idea of motion, or the fact that the ball had actually passed from one position to another, is at once made apparent, and that without the aid of any instrument whatever.

Of course the idea of representing motion by a series of pictures of a moving body in a number of the positions included in the motion is not by any means new, and has long been utilised in the toy known as the "phenakistoscope"—so popular some time ago as "the wheel of life;" but the contention of the gentleman to whom I have alluded is that it is correctly and at once suggested by the three points, and that without any aid from the instrument. The subject is certainly suggestive, and worthy of some consideration; and I have no doubt that where motion is required to be shown, not merely to please the eye, but to convey knowledge of a fact, its adoption will be of much value. JOHN NICOL, Ph. D.

ON THE RADIOMETER.

SINCE this extraordinary little instrument was first described and exhibited by its inventor, Mr. W. Crookes, F.R.S., I have taken a great interest in it, but for some time past I have been regretfully coming to the conclusion that it could not be used successfully for actinometric purposes. Mr. Crookes having been closely connected with photography for many years—he was, as all know, editor of this Journal for some time—it was natural to suppose that he would know the exact requirements of an instrument that could be of use to us either for printing or for studio work, and I was thus greatly impressed with his original recommendation in favour of its use in that direction. At last, however, he himself has, in his most recent communications, given up most of his first conceptions as to the cause of the motion, and, consequently, of any photographic usefulness in the instrument. I have tried many experiments with a radiometer of his own pattern—made, indeed, by the only man who is justified in attaching the word to his manufacture—but in no case could I observe any indication capable of becoming of practical

importance; but I have hesitated to say so till at last the inventor's own published opinion can be quoted as being in accordance with my own views. It is very disappointing; for at first there was so much promise of good result that there was every reason for believing in the prospect of the speedy introduction of an actinometer which could be relied on under all circumstances, and whose indications could be read at sight.

A simple experiment which I made shows very strongly the impossibility of any use being obtained from the radiometer for photographic purposes. If the bulb be *breathed upon* for a few seconds it will cause the vanes to revolve with as much rapidity as a pretty strong light would after passing through glasses which only permit the passage of rays of the greatest refrangibility—the blue, violet, &c. This points as plainly as any experiment possible that it is the rays near the red end of the spectrum which produce the motion; these, of course, are the rays which produce the effect of heat more especially, and have least action in the photographic film under the usual conditions.

Again: a more rough and ready trial, and one fairly representing ordinary conditions of work in the studio, will be found by observing the rapidity of revolution of the vanes under certain easily-distinguished varieties of lighting. It will then very soon be found that on one of those "yellow" mornings, when the light appears very bright and strong to the eye, but practice tells us it is very weak in the camera, the rapidity will be far inferior to what it would be on one of those days when the light is less dazzling, but is, as one can see at once, very "actinic." Naturally it might be objected that the proper test would be to surround the globe with glass of colours that would absorb all the heat rays. It only need be said in reply that the revolutions would be practically reduced to nothing. Mr. Crookes himself, in the days of the earlier history of the radiometer, showed that the least refrangible end of the spectrum had the greatest effect in producing the revolutions, and that the blue and similar rays had less effect. He published a table giving the exact proportion of power conveyed by light of different colours, very little being left in the most chemically-active rays, and yet, at the same time, he appeared to think the instrument available for photographers.

Having disposed of all the bright hopes attaching to the introduction of the radiometer it will not be uninteresting if I give a short *résumé* of the instrument in relation to the accepted theories explanatory of its action.

It was first described by Mr. Crookes in a supplementary paper which he sent to the Royal Society on April 20th of last year, the original paper being an account of a variety of instruments illustrating the same principle, the construction of which gradually led up to the designing of this now world-famous philosophical toy, which for some time has occupied the attention and defied the intellect of some of the foremost men of science of the day. He has been very careful to avoid giving the sanction of his name to any theory of explanation; but yet he has evidently leaned towards the theory that the motion was directly caused by the impact of the waves of ether upon the vanes of the instrument, which, being suspended in an almost perfect vacuum, were ready to be acted upon by the slightest impulse. On a later occasion he went to the length of calculating the actual value of this force, and so reckoned up the actual amount of resistance the whole earth was thus subjected to daily by the mere impact upon it of the waves of light. This calculation, however, has been controverted by Hirn, who has shown the energy calculated to be more than the maximum possible value for the best reflecting surfaces. In connection with foreign criticism it is a strange fact that not till late in the spring of the present year was any attention publicly given to this instrument, the 29th of May being the first date on which I observed it mentioned on the continent.

Mr. Crookes himself advanced one of the most striking proofs of the true character of the action of the light upon it. He reasoned that, if the arms of the radiometer were kept stationary by means of a magnet, no reaction from them should be communicated to the exterior envelope of the radiometer if the etherial wave were the direct cause of motion. He therefore suspended the globe in water, and held the vanes *in situ* by means of a magnet. In a very short time the globe itself began to move, thus showing the wave impact theory to be unable to cope with test conditions. He has now finally stated that he believes the cause of motion to be thermometric, and consisting of an action between the vanes and the sides of the globe containing them.

Professor Stokes showed that the action in any case could not have been directly caused by waves of light, as the arms do not instantly give way to the action of radiation, but require an appreciable time before beginning to revolve.

Fizeau offered for consideration three possible causes in explaining the motions:—First, the action caused by the slight excess of temperature caused by the discs; second, the inequality of absorbing and emitting the power they possessed; third, the excess of elastic force of the layer of air in immediate proximity to the vanes, as under all circumstances there must be a slight residuum of air left in the sealed-up instrument.

This brings me to the most convincing evidence offered by Mr. Crookes himself of the true cause of the motion. In making the earlier radiometers he found that the greater the degree of exhaustion obtained the quicker the discs revolved, till he arrived at a point beyond which his appliances did not enable him to go. There was every reason to believe in the wave theory, seeing that the more the opposing force of the air was removed the more strongly the power, whatever it might be, was enabled to act, and the impulse of a multitude of waves of slight power could show their effect, and it naturally led to the supposition that if, by any means, the whole of the gaseous contents could be removed, the action would be still further increased. To attain this end as nearly as possible Mr. Crookes bent his energies with results which surprised him and others very much. It is hardly necessary to say that, if the original wave theory were the correct one, an instrument so improved would have been simply perfect as an actinometer and invaluable to photographers, as the light rays we make use of could easily have been "filtered out," as it were, by means of a prism. But as facts were against it Mr. Crookes was enabled to improve his means of exhaustion, and he found that increased exhaustion, up to a certain point, produced increased velocity in the waves; but when that point was passed the velocity diminished as the vacuum became more nearly perfect.

The outcome of all the experiments now is the theory I have shadowed forth already. A paragraph devoted to an explanation of it will not, perhaps, be deemed to be too much removed from the scope of this Journal, seeing that to molecular theories we shall have to look for explanations of all invisible photographic action.

The generally-accepted view of the constitution of all bodies is that they are composed of a number of infinitely minute particles called "molecules," and that to the motion of these particles by vibration, rotation, or translation (*i.e.*, from place to place) are due all the phenomenon of heat, temperature, chemical action, &c. The heating phenomena now alone interest us. The exhausted bulb of the radiometer contains but a comparatively small number of these molecules. The action of heat in increasing the temperature is to put the molecules in most violent motion. Sunlight or daylight, including heat rays, being allowed to fall on the blackened vanes soon increase their temperature and the rapidity of motion in the individual molecules which compose it. There is, consequently, on that side a more violent action between the molecules of the *gas* (which, under all circumstances, are always supposed to be in violent commotion, tossing to and fro with great rapidity), and therefore a reaction takes place in a contrary direction—the vanes have a tendency to retreat; and so as long as there is the radiation of heat or light—for there is no more essential difference between them than between the notes on a musical instrument—the radiometer continues its wonderful revolutions.

G. Watmough Webster, F.C.S.

PACKING DRY PLATES AND NEGATIVES.

Many plans for packing plates have appeared in the Almanac and Journal. Perhaps the best was that of Mr. Russell Manners Gordon, which consisted of strips of cardboard glued on narrow silk ribbon.

The method adopted by some of the manufacturers of commercial dry plates is to use pieces of card, bent in a zigzag fashion, to separate the plates. This answers the purpose in a sufficiently-satisfactory manner as long as the plates are in their original packages, but occasions some trouble if they have to be repacked in the same way.

Light-and air-tight boxes are, no doubt, convenient; but when a number of plates have to be disposed of they are both bulky and costly, and, unless constructed with india-rubber fittings, do not offer much security from the effects of rough treatment *en voyage*.

A little piece of apparatus—if I may call it such—which I have submitted to the notice of the Editors, offers considerable advantages over any mode of packing photographic glass with which I am acquainted. The construction is simple. A number of parallel saw-cuts, one-eighth of an inch deep and one-eighth of an inch apart, are made in a piece of mahogany of suitable size. I find

$2\frac{1}{2} \times 1\frac{1}{2}$ inches, and about one-fourth of an inch thick, convenient for whole-plates and under. In these cuts strips of cardboard one-fourth of an inch wide are inserted, and, if necessary, may be secured with shellac; but if the cards fit properly this ought not to be required.

A small circular saw driven in the lathe is the means I have adopted for making the cuts. The saw-table is so arranged that the saw projects only one-eighth of an inch above the surface. This ensures the depth of every cut being alike. An adjustable guide secures parallelism and an equal distance between the grooves. In the absence of a circular saw a fine tenon saw may be made use of, but not with such satisfactory results. The use of this grooving is obvious: applied to the edges of the plates a rubber band over the whole secures the package, which may then be enveloped in the usual wrappings.

A better plan is to protect the plates with four boards, forming, as it were, the top, bottom, and sides of a box, the grooving forming the ends.

Until some form of pellicle or other substitute for glass be found, nomadic photographers must be at the trouble of packing their negatives, and any means of facilitating this deserves attention.

Instead of cardboard strips of zinc might be substituted; but, unless well coated with shellac varnish, they would not be suitable for dry plates.

The above arrangement may not be new; but I can recommend it on the score of efficiency and economy of space.

J. D. Lysaght, *Lieut.*

NOCTES WASHINGTONIA.

No. IV.

The Trossachs.—Clan Alpine.—Developing Dry Plates.

Tom: Incited by the remarks made last evening on the Trossachs, Loch Katrine, and Loch Lomond, I too, in company with Michael and Hendry, made the tour through that district, and have just got back without having encountered much adventure. Michael is a conceited cockney, who can see nothing good outside of London, and he almost brought me into disgrace by his remarks; for you know a man is judged by the company he keeps.

Mungo: What did he say that gave offence? Did he institute a comparison between Primrose Hill and Ben Ledi?

Tom: Worse by far; for while we were sailing down Loch Katrine he kept harping on the beauties of the Thames, and the pleasurable sensations awakened by a sail from London Bridge to Gravesend. Some people are colour blind and don't know pink from drab; but here is a man who is so blind to the beauties of nature as not to realise the difference between the queen of the Highland lakes and the filthiest of mud-embanked rivers.

Little Harry: Its a' taste an' prejudice, as the guid wifie said to Dr. Johnson when the auld jaw-breaker, wha' failed to discover ony thing guid in puir Scotland, reluctantly admitted that the full moon which was pourin' its unbeclouded beams ower Edinburgh, although no' quite the richt thing, was perhaps guid eneuch for a Scotch moon.

Tom: While the "Peripatetic" is unpacking his traps will any one be so good as to tell me who was Roderick Dhu, the hero of Scott's poem? Is he a pure creation or is he a fiction founded on fact, as Simon Hercus said when speaking of his wife's bustle, or dress improver, if you better like that term.

Mark Oute: So far as I can learn, and placing the matter in a nutshell, Roderick Dhu was a black Highland riever who may or may not have really existed in the times of James V. He was the chief of the Clan Alpine, this name having been forced upon them instead of the illegal and dreadful one of M'Gregor. Their country extended beyond both ends of Loch Lomond and along the Highland side of that lake. They suffered much persecution, and not unfrequently took fearful vengeance upon their enemies. History asserts the accuracy of Scott's lines in the mouths of the band of Roderick. [Mark sings.]

"Proudly our pibroch has thrilled in Glen Fruin,
And Bannochar's groans to our slogan replied;
Glen Luss and Ross-dhu, they are smoking in ruin,
And the best of Loch Lomond lie dead on her side.
Widow and Saxon maid
Long shall lament our raid,
Think of Clan Alpine with fear and with woe;
Lennox and Leven-glen
Shake when they hear agen
Roderick Vich Alpine dhu, ho! iero!"

Little Harry: Ech, sirs! but they maun hae been a bluidthirsty crew! But at this moment I'm mair interested in the development o' the negatives o' the nests they were supposed to hae occupied than in the rievin' thieves themsels.

Per. Phot.: Well, then, as I am in a better position now to develope my plates than I was last evening, when we had nothing but tea, coffee, and smelling-salts to fall back upon, I purpose giving you a practical demonstration of the whole system of development as practised when one is away from home.

Mac.: But of course it will also answer when one is at home, will it not?

Per. Phot.: Certainly, but it suits my purpose better to assume that we are, as is in truth the case, several hundreds of miles from home. The greater the difficulties placed in our way the more the credit that will redound to us for overcoming them. First of all, I light this candle and turn out the gas.

Mac.: But the light from a candle ought to set up a change in the sensitive surface equally as if it were subjected to a gas flame.

Per. Phot.: True; but here are three pieces of thin millboard which, you observe, are hinged together by a strip of calico, yet in so loose a manner as to allow the whole to be folded up flat. In one of them is a pane composed of yellow calico. Now, when I bend this round the candle you observe that all light is closed in except that which passes through the yellow pane and that which escapes at the top, but which we need not mind.

Mark Oute: It is a very simple contrivance, and so excellent that every tourist ought to carry one with him.

Per. Phot.: Having got the light under control, I now place a plate upon the holder and do to it something that may surprise you all, viz., press against each side in turn a tallow candle in such a way that it leaves a margin of tallow all round the plate, encroaching upon the collodion film to the extent of about an eighth of an inch.

Mungo: Why a tallow candle? Why not one of wax or paraffine?

Per. Phot: You will see just now. Having bordered the plate I now pour over it a little brandy.

Harry: Wheugh! you're a jewel o' a fellow! I kent that if tea or coffee would develope a picture, a drap o' speerits wad be sure to do the same.

Per. Phot.: But you're mistaken, for the brandy I am now using is merely intended to soften the film a little to enable the developer to penetrate. I now pour it off—it has been on for upwards of a couple of minutes—and I rinse the plate with water. Now see the use of the tallow edging: not a drop of water can reach the margin of the film so as to get under it and disturb the attachment of the film to the glass. No matter how long and protracted the development may be the tallow protects the film against all injury, for no water can lodge upon it. I now pour into this measure as much water as will flow over the surface of the plate, adding three or four drops from this small bottle, which contains a very strong solution of pyrogallic acid.

M'Edin.: What is the solvent?

Per. Phot.: Water, to which has been added a large proportion of tannin. Many prefer alcohol; but, as you observe, water containing tannin enables one to keep a concentrated pyrogallic solution without deterioration for a considerable time. I now apply this solution to the surface, and, behold! already faint traces of the image begin to appear. I now put into the developing cup half-a-dozen drops of a saturated solution of carbonate of ammonia and a couple of drops of a solution of bromide of potassium, and, pouring back the pyro. solution from off the plate into this vessel, I return the whole back again to the negative. Look! the formerly feeble image is now rapidily assuming great vigour and intensity.

Mac.: But why not mix them all together and make them much stronger than you have done? Would not that enable you to shorten the exposure?

Per. Phot.: The reason why I prefer developing as I have done is this—by applying the pyrogallic solution first I acquire some idea as to the degree of exposure the plate has received. If the whole of the details come out at once it indicates over-exposure, and I must add bromide to check further development. If the details do not show at all, then under-exposure is manifest, and the total omission of bromide is necessary. By far the most certain mode of procedure is to give a full exposure and develope in the way I have done, but stopping short at a point far removed from printing intensity; then wash the plate and give the image the required degree of density by the old-fashioned acid pyro. and silver. If you do this you will not lose one negative out of twenty. As regards my objection to using a strong developer to such plates as those before you, I find that when I do so transparent spots—the nature of which has puzzled both the chemist and the microscopist—are often formed

in the negative; by adopting the method described I get rid of them. Now, this negative having been developed and fixed, I purpose removing it from the glass and transferring it to this sheet of paper.

(To be continued.)

PHOTOGRAPHIC PORTRAITURE.

Chapter IV.—Some Lessons from Leslie.

The late Royal Academician, C. R. Leslie, was wont to exclaim about the usual protests against the preponderance of portraiture at the annual exhibitions of the Royal Academy, by saying that it was not the kind or quantity but the quality of the works exhibited which elevated or degraded the character of the whole collection. He also pointed out, as he does in his *Handbook*, that artists who could not invest a portrait with interest and artistic excellence would not produce works of any higher character if they selected imaginary subjects from poetry, history, or landscape.

Portraiture, indeed, affords full scope for the exercise of great and intellectual artistic taste and power, and those who hold a contrary opinion have certainly not given much thought to the subject, or seen appreciatively the great works to which, in the preceding chapter, I have called attention. He (Leslie) says of it—"Such art as his requires, indeed, the highest powers of mind, hand, and eye; and I do not believe that when Raphael or Titian occasionally quitted history for portraiture it occurred to them that they were descending to a lower sphere, and I am sure they did not find it easier to satisfy themselves." Art was not classified of old as it now is, and the great masters of the past elevated their subjects and were not elevated by them, as the young artist who hears portraiture sneered at as an inferior branch of art is only to apt to suppose. All the old masters whose works have been the pride and delight of successive generations, and for the possession of which nations have contended, were portrait painters.

"Even Michael Angelo," says Leslie, "was great in portraits. There may not remain any *painted* portraits of known persons by his hand, but there are sculptured portraits by him; and it is impossible to look even at the engravings of the Prophets and Sibyls without seeing that they are from a hand practised in portraits—a hand, too, that had acquired its power by the practice of liberal exactness." Even Fuseli, who held the detail of character to be inconsistent with the grandeur and poetry of epic art, when writing of Michael Angelo's works, confesses that each prophet has distinctive individuality and well-marked, portrait-like characteristics, and speaks of the sibyls as similarly expressive of individual character. Commenting upon these great works in the Vatican, our teacher of this chapter says:—"There cannot be a doubt that Michael Angelo, had he devoted himself to portraits only, would have been a superlative portrait painter, for in his works we find everything in perfection that portraiture requires—dignity, the expression of character, the highest perception of beauty in man, woman, and child; and not only in the unfinished marble that adorns the Royal Academy library, but in the smaller compartments of the Sistine ceiling at Rome, wherein the most natural and familiar domestic incidents are treated in the most graceful manner." And Leslie, still upholding the dignity and importance of portraiture in a way which should impress all who follow the art, whether photographically or otherwise, adds:—"It is right that this should be remembered, because painters, as they fancy themselves, of high art who really have not talents portraits require, must not be allowed to class themselves with Michael Angelo as long as they cannot do what he in perfection could do." So teaches Leslie in a lesson which cannot be too forcibly impressed upon the minds of all those who are students of portraiture as a branch of art.

Leslie, as I have shown in a former chapter, held the works of Sir Joshua Reynolds in the highest estimation, and speaks glowingly of the portraits of Vandyke, thus endorsing the lessons from preceding great masters already spoken of in these papers; but he does not place Vandyke in the front rank, and speaks complainingly of his posing of single figures, the attitudes of which, he says, "are often formal and unmeaning." It is, in his opinion, "the fine treatment of his masses" that, with certain qualities of colours to which I need not allude, have placed him high in portraiture. He held Velasquez to have displayed much higher powers than Vandyke possessed, and therefore directs the student to his works as lessons. He notes, as the noblest group of portraits in the world, the finest work of its class Titian ever produced, the Luigi Cornara family group. In this picture the fine old man, whose life had by temperate living, as was supposed, been protracted to a hundred years, is seen kneeling before an altar in the open air surrounded by his grandchildren and son-in-law, three of the younger children being represented playing with a little dog on the steps. In this famous work Leslie points out, as specially worthy of the student's attention, the characteristic arrangement of the figures, the noble simplicity of the lines, and the truth and power of the colour—the last being a subject with which, of course, the photographer has little to do except in so far as the colours represent tones, in which respect all great paintings should be esteemed highly deserving of his serious and persevering consideration.

A dear friend of mine—now alas! no more—the late O. G. Rejlander, used to study the works of great painters with the greatest care. He grouped and lighted, with a view to realising their exact effects, scores of carefully-selected, draped, and patiently-trained models, and in many cases produced photographs from the life closely resembling the great originals. He held portraiture, and photographic portraiture, in the highest estimation, and had been convinced by such studies that he was right in doing so. I have also heard him speak very highly of the value of Leslie's teachings, and praise in his works those excellences with which photography can most readily cope. For Leslie was a painter of the Wilkie school as opposed to that which poor Haydon so fervently upheld, and utterly opposed to the extremely anti-photographic theories of wild Fuseli, whom nature only "put out"—a teacher whose followers are, at least in England, now extremely few and far between. He sought to realise, not to "improve," nature, and many of his figures are as carefully copied from the models he selected as they could have been with the lens and camera as veritable portraits. In the same way Leslie's rustic figures are never the masquerading supernumaries of the stage, but carefully realistic studies from life—selected life, not haphazard models—and are, as somebody says, "village bred and village fed," with complexions produced by exposure to ever changeful sun and air, and not the rouge pot and hare's foot. Real old farmers and farm labourers were his models for such pictures as (say) *Sir Roger de Coverley Going to Church;* and he painted from them so that each was a portrait—not formal in expressive "front elevations" of men and women, but breathing figures, animated by thought and feeling.

A. H. Wall.

NOTES ON PASSING EVENTS.*

By a Peripatetic Photographer.

I suppose it is incumbent upon me to say something concerning that—I was nearly going to write "shameful" exposure, but I shall suppress the adjective and merely say—*exposure* that has been, nay is still being, made of the sayings and doings of a few friends met together in social and semi-private conclave in the smoking-room of a Glasgow hotel. Is it fair—is it politic—is it prudent that the transactions, the quiet chat and gossip, of a few friends enjoying social relaxation—the *entente cordiale*—after a day's scientific work at the British Association should be dished up and presented as mental pabulum to the readers of this Journal? I do not for a moment question the accuracy of the report; it is only the expediency and, if you like, the *legality* of doing so that I question. Cannot the law of copyright be brought to bear on such a case, in order to prevent the publication of private conversations? If I see standing at the corner of a street a group of celebrities—men or women famous in the world of science, literature, music, the prize ring, or, if you choose, demi-monde-ism—and if I direct a camera at them and secure the group in a faithful photograph, have I a right to show that photograph, nay to *publish* it to all the world? Some day, when my autumnal avocations afford me an hour's leisure, I must call at the office of this Journal and have a very serious talk over the matter with our Editors. It was *too* bad to promulgate the insinuation about Little Harry's getting fuddled and my having blacked his face with silver; and if it were not the case that he rather enjoys the notoriety he has obtained in connection with that episode I might almost have gone the length of asking him to take his solicitor's opinion as to a personal application of the law of libel under such circumstances. I think I hear you say that "truth is no libel;" but in this case I conceive that it is fairly entitled to be considered as such. But here the "red herring" is drawn across the scent so far as Harry (who *is* a drouthy creature) is concerned, and, dropping him, I ask if I—supposing me to be a newspaper critic—think it right or proper to condemn in terms of severity a play, a book, or a photograph, can be sued for libel? Suppose that I damned in the strongest language at my disposal the photographic works of any particular artist at the Centennial Exhibition, and held them up to that ridicule and contempt to which they

* Concluded from page 523.

might be justly entitled, would he not have a claim against me for having damaged his reputation and business? And if this be so, as a recent decision seems to imply, is it legally safe for a journalist to speak his mind when criticising a collection of pictures in a photographic exhibition? If any reader desire to write an essay on criticism from the legal standpoint let him take up this as his text.

From a recent report of a meeting of the Edinburgh Photographic Society I observe that the members of that body have had before them the question of how to make their ensuing exhibition successful. Here is one hint for them: let the title of each picture and the name of the artist be imprinted upon each in a conspicuous manner—a manner sufficiently perceptible, at any rate, to enable anyone examining the picture to ascertain without difficulty what is the subject of the work, and by whom it has been executed. The absence of these items of information from the majority of the pictures at the London Exhibition has in no small measure detracted from the pleasure one feels in examining such pictorial exhibits.

With pleasure let me in the name of the fraternity generally give a cordial welcome to the Bristol and West of England Amateur Photographic Association. During the past dozen years several photographic societies have in that district been ushered into existence, and, if I recollect rightly, one of them had a bishop as its president. Evanescence, unfortunately, seems to have been inherent in their constitution. In connection with the future of the present enlarged Association let us say—*esto perpetuum!*

If, as Mr. Warnerke says, the atoms of glass throughout the substance of that article receive and scatter rays of light—or, in other words, arrest its transmission—the fact applies in an equally strong manner to lenses as to the plates upon which the negative is taken. If this be so then thickness in a lens cannot be a very desirable element, as it will tend to render it slower in its action. It has long since been proved that rock crystal possesses greater transparency than glass; and if some similar material having equal transparency, but a different ratio of dispersion, be obtained and combined with a lens made of rock crystal to produce refraction without colour, then it will be possible to obtain a quicker-acting lens than can be formed of glass. But this opens up the old question of fluid lenses; for it will be admitted that the light-scattering propensities of the atoms in glass are not shared in by perfectly clear and colourless fluids. However excellent and pretty all this may be in theory I stand on safe ground in expressing my opinion that in the formation of lenses glass only will continue to be employed.

GLASS FOR THE STUDIO AND DARK ROOM.*

I PRODUCED a third print with colourless and ground glass by an exposure of one or two minutes, showing the effects of the grinding of one or both surfaces in cutting off the chemical rays. I cannot speak in mathematical terms of the proportion thus cut off, but the much lighter shading of the sensitive paper under the ground pieces showed quite a loss of actinic power, which was sensibly increased when both surfaces were ground.

I made another print with various specimens of colourless plate, crown, and sheet glass, showing different colours when observed through the edges of the 4 × 2-inch pieces. An exposure of a minute, or half-a-minute, is sufficient to show the comparative transmissive power of these glasses. The white French plate passed the most, and some dark green and bluish-green sheet glass the least, chemical influence.

I made another print showing the effect of colourless glass of different thicknesses, and of several intervening surfaces in cutting off the chemical rays. In the upper row I placed glasses one-quarter, one-half, three-quarters, and one inch in thickness, and, immediately beneath them, of the same kind of glass, one, two, three, and four pieces respectively, each one-quarter of an inch thick. The result of an exposure of a minute showed that increasing thickness or increasing number of surfaces diminishes the power of passing the chemical rays; that is to say, a piece one inch thick cuts off more than one-half, or a quarter of that thickness, and four pieces, each one-quarter of an-inch thick, superposed on each other, cut off more than a single piece one inch thick.

I made another illustrative print by placing some of my specimens of glass—changed in colour by sunlight exposure of one year—between original and unexposed pieces of the same kind, arranged on either side, and, by an exposure of a minute or half-a-minute, showing by the different shading of the sensitive paper that the yellowish or purple colour of the changed specimens have sensibly diminished their power to transmit the chemical rays.

* Concluded from page 524.

I made another print with coloured glasses of the same colour, but of different shades and tints, the darkening of the latter always showing a decreasing power to transmit the chemical rays.

I trust that these experiments, if of no other value, will prove to my photographic friends two facts:—1. That in studios where one needs all the chemical rays that can possibly be obtained care must be taken in glazing the skylights with colourless glass unground on either side, and of a kind that will not easily change to a yellow or purplish tinge by sunlight exposure. 2. That in dark rooms where little or no chemical influence of the sun's rays can properly be admitted, yellow glass of any kind or shade is entirely unfit for the purpose required; and that orange or green, or, better, orange and green or two thicknesses of orange, must be substituted.

Red is known to be by far the most non-actinic glass, and would be recommended but for its dazzling effect, which is injurious to the eyes of the operator. During the past few years I have read so many wails in our photographic journals from operators who have been troubled with the fogging of plates in the dark room from the use of yellow glass, and so many suggestions about the substitution of yellow cloth or paper, or some other colour or colours of glass, that I thought the publication of the results of my experiments, as above given, could not fail to be of some practical importance to the fraternity.

Perhaps it may add a little interest to my essay if I give a brief account of some supplementary experiments in the same direction made during the present summer. I had a curiosity to know how soon the chemical rays would begin to show any influence on the sensitive paper under glasses of the main colours, red, orange, yellow, green, blue, and violet. I used for my experiments ordinary albumenised paper, sensitised for me by my friend, Mr. Marshall, of Boston. Taking several sheets into the country with me I used it many days, as it did not turn very yellow by keeping. I also made confirmatory experiments with fresh paper obtained from a photographer located in the place of my temporary sojourn. Placing some pieces of the colours named, of the uniform size of two inches by one, upon a sheet of clear glass in a pressure-frame, I put a narrow strip of brass over the middle portion of the whole line of glasses, then covered them with a piece of sensitive paper put on the back board, and commenced an exposure to the light, counting off the seconds and making constant examinations of the paper. At the end of one second the paper under the blue, violet, and yellow showed a distinct line of shading, plainly contrasting with the lighter colour under the brass strip, proving that chemical action had already commenced on the sensitive surface of chloride of silver. In six seconds orange showed the same effect, and in eight seconds the green. The red did not show any change until after an exposure of three minutes. The effect of these short exposures of a few seconds, of course, is not visible after washing, toning, and fixing the print; but it is interesting to know how soon chemical action commences in these cases.

The effect under colourless glass commences instantaneously, and so great is the contrast between the two extremes of red and of colourless glass that I have produced a picture in purple colour upon a piece of colourless glass, easily changed by sunlight exposure, simply by the following method:—Having a design of leaves and flowers cut upon the surface of a piece of red or ruby-flashed glass, I fastened it with copper wires over a piece of colourless glass of the kind above named, and exposed in several months to direct sunlight. Enough chemical action took place under the red glass to make the body of the colourless glass beneath of a purplish colour; but enough *more* took place under the transparent design to show a much darker contrasting shade of purple, and thus produced the picture.

I have endeavoured, by a multitude of experiments with these various colours of glass and varying lengths of exposure, to arrive at a mathematical statement of the comparative powers of the six coloured glasses named to transmit or cut off the chemical rays of sunlight; but I will not venture on any positive and exact statement at present, because I should not wish to make a mistake, and because I have seen so many premature and erroneous opinions in print on matters in connection with glass. I think it an approximation to the truth, however, to say that blue having been clearly proved to be the most actinic of all coloured glasses, cutting off only a comparatively small proportion of the chemical rays, violet may be said to cut off twice as much, yellow to transmit a little less than the violet, orange and green to cut off about twice as much as the yellow. Red will cut off almost all the chemical rays, requiring several hours to produce beneath it in the finished print the shade which appears under the orange or green after a few minutes of sunlight exposure.

Colourless glass cuts off so little that an exposure to sunlight of one second will produce a distinct shading under twenty thicknesses

of about ten to an inch. Six pieces of ground glass or six of blue glass will produce a similar shading in the same time.

I have thus far spoken only of the effect of the chemical rays on sensitive paper under one thickness of glass. I have made several experiments for varying lengths of time, from a few minutes to *four* hours or more, under all the various double combinations which can be made, in connection also with a single and double set of these several colours.

I made a careful observation before and after toning and fixing the prints, noting the short exposures to obtain the comparative transmissive power of the most actinic glasses—like the yellow, violet, and blue—and noting the long exposures for the effect under the red, green, and orange combinations. It will be seen that the green used by me was more effective than the orange. The orange and green of a similar intensity of colour and shade do not generally differ much in actinic power.

A slight difficulty in classification arose from the fact that some of the adjoining combinations—as, for instance, orange and green, and two greens, or orange and blue, and yellow and violet—have nearly or exactly the same transmissive power.

There is a great variety of shades and colours produced in the sensitive paper under differently-coloured glasses, and with the same colour exposed for different periods of time.

I will not fill your columns with a long table which I once made, showing the colours before and after toning and fixing, in a series of exposures from one minute to eight hours. I will only briefly say—what may be known to many—that little or no effect is obtained under the red, except a very slight shading, varying with length of exposure from light-reddish to a slatish colour. Under the orange, green, and yellow colours of a light-bluish slate to a reddish-brown are produced. Under the blue and purple different shades of slate, reddish brown, and black appear. These differences make it difficult sometimes to assign the exact place to some colours in an enumeration like the following, which I think will be found to be a close approximation to the order in which the glasses or combinations of glasses cut off the actinic rays—the first, the red and green, transmitting the least; and the last, the blue, transmitting the most chemical influence.

It presents some unexpected effects—the red and the blue, one the most and the other the least actinic, cutting off when united more than two reds, or red and orange, or red and yellow. I will not attempt any fanciful theory in explanation, but only state the fact and subjoin the table.

Table showing the order in which the glasses named transmit the chemical or actinic rays of sunlight:—

1. Red and green.	15. Orange and yellow.
2. Red and blue.	16. Orange and blue.
3. Two reds.	17. Yellow and violet.
4. Red and violet.	18. One green.
5. Red and orange.	19. Yellow and blue.
6. Red and yellow.	20. Two yellows.
7. One red.	21. One orange.
8. Orange and green.	22. Two violets.
9. Two greens.	23. Violet and blue.
10. Green and violet.	24. Two blues.
11. Green and blue.	25. One yellow.
12. Green and yellow.	26. One violet.
13. Orange and violet.	27. One blue.
14. Two oranges.	

The above list may be of value to photographers, in enabling them to know what combinations to select when they desire to cut off the utmost amount of chemical influence or a proportionally smaller degree from their dark rooms.

In order to avoid the fogging of plates with certainty it would be advisable to use any of the double combinations in the first half of the list, rather than a single piece of any colour, as no one but the red stands high in the enumeration, and that is too dazzling for the comfort of the operator.

In making experiments for the preparation of a table like the above it is necessary always to cut all the pieces of any one colour from the same sheet of glass, as the slightest difference of thickness or tint may make a variation in the result obtained. Even this precaution is not always sufficient, as I have sometimes seen varying degrees of thickness and varying tints of colour in different portions of the same sheet. This difficulty can be remedied and a source of error removed only by a critical examination of each piece, and a rejection of any one which is not of the requisite and uniform thickness and tint.

When I return to Boston I propose to provide myself with a new set of specimens thus critically examined, and, as I find opportunity, to repeat my experiments of the past summer. Should I obtain any new or essentially different results, and deem the matter of sufficient importance, I will write a supplementary note for publication in some future number of the *Photographer*.

While we cannot yet, and perhaps never may, produce photographs in colours I would suggest that pleasing effects may be obtained in the borders of cabinet or large prints by a judicious use of shields and coloured glasses. For instance, by means of a shield of brass, or of opaque paper of the size of any pressure-frame with an oval piece cut out, one can obtain an oval-shaped print of a portrait or a leaf Then by covering the print with the oval piece of brass or paper, and placing it on a piece of green glass in the pressure-frame, and exposing for ten or fifteen minutes to direct sunlight, a pretty border of light slate colour may be obtained, and quite a variety of shades and colours can be produced by varying the coloured glass and the length of exposure. A tasteful design upon flashed or stained glass by a skilful glass-cutter will be printed in a dark colour, whose contrast will add to the attractiveness of the border. But superior and artistic work, perhaps, does not need any such superficial attraction.

My experiments with different coloured glasses led me also to use differently coloured autumn leaves as negatives, and to produce some very interesting leaf-prints, showing the same comparative effects in cutting off the chemical rays as the glasses of the same colours. These were followed by similar experiments in making designs and mottoes from leaves, ferns, feathers, and sea-mosses, producing what I have named "Photographic Self-prints from Nature," of which I have exhibited a few specimens at the Centennial Exhibition. I need not enlarge on the interesting field which this development of one of the many possibilities of the photographic art opens up to artists and amateurs, for it has already been done in previous numbers of the *Philadelphia Photographer*, in 1869 and 1872.

Having thus given an account of my humble amateur experiments in elucidating the connection of glass with the photographer's art, I shall be amply repaid for my effort if it shall communicate anything of interest or value to those whose daily work is in this interesting field. THOMAS GAFFIELD.

FOREIGN NOTES AND NEWS.

DR. SCHNAUSS' REMEDY FOR OVER DRYNESS OF TISSUE WHICH REFUSES TO TAKE ON THE BICHROMATE BATH, &C.

WE have been long accustomed to the periodical lamentations over the shortcomings of albumenised paper, and to the answering crops of specifics for their prevention. When the carbon process was introduced it was readily adopted by many in the belief that they should thenceforth have no further trouble with paper, toning baths, or faded prints. But how vain was the expectation of saying good-bye to all annoyances and meeting with an absolutely perfect process these optimists were not long of learning, and the old cry was taken up again with the substitution of the word "tissue" for albumenised paper.

First, it was discovered that in the matter of permanency—which is claimed as the greatest point of superiority of the carbon process over silver—all depends on the nature of the colouring matter or pigment mixed with the gelatine to form the tissue; and here the photographer is at the mercy of the manufacturer of the tissue, just as he was formerly dependent upon the paper-maker for paper that should contain no salts likely to act injuriously upon the albumen or the silver bath. Then with the hot weather came complaints of the difficulty of drying the sensitised tissue without the gelatine running or the film becoming horny, refusing to absorb water, and devoid of adhesive power, as if the whole surface of the film had been exposed.

For the first of these difficulties Mr. Koch, last week, suggested as a remedy that the tissue be merely floated on the bichromate bath instead of being immersed, as is usually done. The latter difficulty has also been very troublesome to many, amongst others to Dr. Schnauss, who, at one time, feared that several rolls of tissue in his possession were to be absolutely useless; but at length he fell upon a simple expedient by which a good deal of it was saved. Proceeding upon the assumption that whatever remedy was applied must be done before sensitising the tissue, and that what was required was the application of a (so to say) new porous surface to the over-dry tissue, the mere action of moist air being insufficient to produce the desired effect, he proceeded as follows:—He cut a roll of tissue into pieces of a convenient size and dipped them, separately, into a bath with cold water. As soon as a sheet lay flat it was taken out and laid flat upon a horizontal glass plate. A vessel containing clean water heated to 50°,

and about five per cent. each of sugar and glycerine, was placed at hand, and into this a broad pencil was dipped and drawn equally across the paper in every direction. The gelatine was thus melted to a greater or less depth, according to the heat of the applied mixture, and as soon as paper so restored had become quite cold it was hung up to dry slowly in a cool place free from dust. The surface thus obtained took on the sensitising and other baths very well, and the resulting pictures were neither black nor granular. In two pictures printed upon tissue cut from the same roll, one piece of which was restored and the other not, showed the difference caused by the "restoration" in a very marked manner. The tissue in question was that used for ordinary portraits; but with a roll of black transparency tissue which he tried to treat in the same way Dr. Schnauss was quite unsuccessful. He, however, congratulated himself upon having, at least, been able to utilise the greater part of a lot of tissue the whole of which he had given up as useless.

SCIENTIFIC JOTTINGS.

The question of weights and measures, *apropos* of the metrical system, has often been mooted in these columns, and both old and new systems have had staunch advocates. A contribution to the discussion has been made by the Franklin Society of Philadelphia a little while ago, who appointed a committee to take into consideration the desirableness of petitioning Congress to do away with all the old standards. The committee have pronounced decidedly against the plan. They say:—"The metre is really as arbitrary a standard as the foot. About eighty degrees of latitude have been measured, but no two of them have been found of the same length. * * * The only real thing about it is the rod in the public archives. The length of the metre if lost is to be recovered by comparison with the length of the seconds' pendulum. * * The metre in any shape is a less convenient instrument than the two-foot rule," &c. This report is quite in keeping with the expressed opinion of many well-known men of science, that the metrical system is neither theoretically nor practically a useful one.

Photography has been able to render great service to astronomy of late. For a long time it has been a moot question whether or no there revolved one or more small planets within the orbit of Mercury, and the publication by Weber of an observation he made on April 4th last has caused many to incline to the belief in a planet's existence. He discovered a small round black spot upon the sun where he should not ordinarily have expected to find any such appearance, and on the following day it had disappeared just as a planet in the course of its transit would do. A great deal has been said and written on both sides of the question, but nothing had been proved till the publication of a communication from the Greenwich Observatory—where daily photographs of the sun are taken all the year round—conclusively showed that on the day in question a spot as nearly as possible in the place indicated by Herr Weber was visible in the photograph of the sun's face. The authoritative statement goes on to say that it was an "ordinary sun spot without penumbra, and not an extra-mercurial planet."

The brilliant colour, fuchsine, has become familiar to photographers of late since its use for dry plates. A very interesting and remarkable account of the degree to which it may be diluted and its colour still remain visible has been given in a lecture to the Berlin Chemical Society, by M. Annaheim. He dissolved about ·0007 gramme in spirit of wine, and then diluted it to the extent of a thousand cubic centimetres; the colouration was most strong and marked. Making certain calculations from these data he concludes that we can perceive with the naked eye so small a portion of the fuchsine as ·00000002 gramme.

Another topic which has often formed a subject for discussion in this Journal has been the supersaturation of a bath by iodide of silver. By many the term has often been held up to ridicule as representing an impossibility; but it can now, owing to recent researches, readily be shown how correct it is, and how a state of supersaturation may be easily brought about with either it or many other salts. A most interesting paper, by J. G. Grenfell, was read before the Royal Society a month or two ago in which experiments and examples of over-saturation were given at length. The paper is too long for these pages, but a few extracts may be made from it to show its interesting nature, and those who like can refer to the original paper in the *Proceedings of the Royal Society* (No. 172, page 124, *et seq.*). A due understanding and appreciation of the many experiments there recorded should be able to throw quite a fresh light on the vexed question of pinholes through iodide in the bath.

Making, by means of heat, a variety of solutions containing much more than the normal maximum amount they are capable of dissolving at ordinary temperatures, he placed them in scrupulously-clean vessels and covered them over with pieces of filter-paper, the plugs of cotton-wool just used frequently causing the experiment to end prematurely through small particles dropping away from them into the liquid. These supersaturated solutions were then allowed to cool, and, instead of depositing crystals, they remained clear for an indefinite length of time. So far, of course, the same thing has been done years ago; but the investigation was to endeavour to discover the cause of crystallisation when it did occur in the manner one is familiar with in similar experiments, apparently without any cause.

Mr. Tomlinson has investigated this subject before, and concluded that adhesion was the cause—the slightest addition of any substance of a greasy nature sufficing to cause immediate crystallisation, sometimes reaching solidification. The most commonly-received theory is that of which M. de Gerney is the most prominent advocate—that *only a crystal of the same salt* causes crystallisation, and that these are introduced by the air. On the whole, Mr. Grenfell leans to this theory.

The following are some remarkable results he obtained:—Solutions of sulphate of soda placed on a plate did not crystallise when wafted with a newspaper, neither when a strong current of air was drawn over them in a glass tube. He placed drops of these supersaturated solutions in dust-covered leaves in his garden; they merely dried up. Taking a supply upstairs he placed drops in all sorts of places—on the window-sill inside and out, on the iron bars outside, and also spread a drop with his recently-washed fingers on the window-sill; still without crystallisation. Potash, alum, acetate of soda, ammonia alum, and many other salts behaved almost similarly, crystallisation occurring only in a few cases. All these experiments were made under conditions which one would have thought it next to impossible to avoid the separation of the salt—the solution, it must be remembered, being far above the usual point of saturation.

In thus noting the saturation of water with saline substances we are led to speak of the saturation of air with water vapour—a very important point in many dry processes. Some investigations have been made by Mr. H. C. Dibbits, who gives a description of the action of various desiccating agents, with the differences in their action, caused by varying temperatures, and also the details of various means for saturating air with vapour; the latter, however, is not of much practical importance to photographers.

When chloride of calcium is the desiccating agent, temperature greatly influences the results. The substance of the results may be broadly stated to be a diminution of the absorbing action as the temperature of the salt increases. Concentrated sulphuric acid (containing not more than 8·4 per cent. of water) dries the air at temperatures up to about 25° so thoroughly that 100 litres do not give up to phosphoric anhydride more than ·0002 gramme.

If the temperature be higher than 25° or 30° sulphuric acid does not so completely desiccate air; yet the quantity of water vapour contained in a litre of air dried by its means amounted to less than ·0001 gramme.

Phosphoric anhydride may be said to effect an absolute desiccation of air. The question of the best desiccating agent for drying closets, which we have before discussed, has thus thrown upon it some very interesting light.

We, in previous *Jottings*, gave an account of various kinds of cellulose, and we now extract from a recently-published work (a reprint from the official report of the Vienna exhibition) a few details of the hygroscopic character of the various kinds available for the manufacture of pyroxyline. It is not sufficiently recognised that upon the complete desiccation of the cotton or other material depends in a great measure success or its reverse in gun-cotton making.

Belgian flax, air-dried, contains...	5·7	per cent. of water.
Cotton	6·66	,,
Manilla hemp	12·5	,,

In air saturated with aqueous vapour the amounts are much larger—thus, cotton absorbs 20·99 per cent., and Manilla hemp 40. Hence it is obvious that the water introduced by the cellulose alone is a matter of prime importance, when it is borne in mind that a difference of one per cent. will materially alter the character of the resulting pyroxyline.

It has often struck us as a fortunate and somewhat remarkable fact that nitrate of silver—which more or less is in continual contact with the photographer's fingers—never appears to get absorbed into the system; for the effect when this agent is used internally as a medicine, as in some extreme cases it is, are of a most disagreeable nature. The whole system becomes impregnated with it, and the patient's skin becomes for life of a ghastly blue and cadaverous hue, which no means yet tried have been able to discharge. We are led to the mention of this by having recently seen an account of a case of lead poisoning in which the patient quickly recovered by means of galvanic baths, the whole of the lead being eliminated from the system and dissolved in the baths. Would it not be possible to take the silver out of our system by similar means?

Photographers cannot be too careful, as we have so often insisted, in the handling of the dangerous chemicals with which they are so familiar, and, on the whole, there are marvellously-few cases on record where their handling has been proved to have had noxious effects; not so, however, with the manufacturing of the chemicals, the workman being subject to peculiar diseases in the making of some chemicals, notably bichromate of potassa. But even with them due carefulness removes most of the danger. We recently learned, in an account of the manufacture of bromine, that workmen were selected who had well developed respira-

tory organs, free from any tendency to asthma or catarrhal complaints. The use of spirituous liquors is strictly interdicted, as the insolubility of the mucous membranes which they produce is exceedingly dangerous; on the other hand, a generous diet is recommended. These instructions could not be much improved upon for general adoption by operators in the dark room.

Meetings of Societies.

EDINBURGH PHOTOGRAPHIC SOCIETY.

THE seventeenth annual general meeting of this Society was held at 5, St. Andrew-square, on the evening of Wednesday, the 1st inst.,—the President, Dr. Thomson, in the chair.

The minutes of the last general and ordinary meetings were read and approved, and Messrs. S. E. Palmer and S. Tomkin were admitted ordinary members.

The Secretary then read the following

ANNUAL REPORT.

YOUR Council, in reporting on the state of the Society at the close of this the sixteenth session, have pleasure in calling the attention of the members to its increasing prosperity.

There have been held during the session, in all, eighteen meetings, viz., three popular evenings, three outdoor, two special, and nine ordinary meetings, and the annual excursion, the business transacted at which has been as follows:—

Popular Meetings.—1. A series of views illustrating Paris before and after the war, furnished by Lieutenant Gilbert, with descriptive lecture by Baillie Marshall.

2. A series of views, work of the members, with descriptive lecture by Dr. Nicol.

3. Selection of pictures of the animals at the Zoological Gardens, London, interspersed with Indian scenery, kindly lent by Mr. F. York, of London, with descriptive lecture by Dr. Nicol.

Outdoor Meetings.—These were held at Cragie Hall, Winton Castle, and Hatton House—at all of which good photographic work was done.

Ordinary Meetings.—At these meetings the following papers were read:—

1. *Exhibitions a Stimulus to Advance True Progress in Art-Photography.* By Mr. Asher.
2. *The Progressive Results of the Past Session.* By Dr. Nicol.
3. *Enlarging and Enlarging Processes.* By Mr. George Croughton, of Lowestoft.
4. *A Short Tour with the Camera in Belgium.* By Mr. John Lessels.
5. *Experiences in Working Gelatino-Bromide Emulsion.* By the Rev. H. J. Palmer, of Birkenhead.
6. *Carbon Printing*, with practical demonstrations. By Mr. J. G. Tunny.
7. *Small Scale Maps for Tourists.* By Mr. Robert H. Bow.
8. *Further Notes on the Effects of Light on Pigments.* By Mr. Robert H. Bow.
9. *Experiences in Working Emulsion Plates.* By Messrs. Turnbull and Mathison.
10. *What Should be Done to Make the Exhibition a Success?* By Mr. W. H. Davies.

There were exhibited at the various meetings the following pictures and apparatus:—A series of pictures, the work of members; a new photographic tent, by Mr. Bainbridge, of Barnard Castle; a photographic curiosity, by Mr. E. W. Dallas.

Your Council think it right here to state that, in addition to the above, they have held fully a dozen meetings in connection with the forthcoming exhibition.

Three distributions of pictures were made during the session. These were contributed by Messrs. Mathison, Crighton, Sinclair, and Yerbury.

A donation of a number of pictures from gelatine plates was received from Mr. R. Kennett, through Messrs. Ross and Pringle, for the Society's album.

Your Council, in calling attention to the business transacted during the year, desire to impress upon the members that the contribution of papers or other matter at the ordinary meetings is alone that upon which the Society can rely for preserving the status which it has always held, and urge the members to strengthen their hands in this direction.

With reference to the popular evenings your Council believe they have been decidedly successful. Although they do not directly minister to the ordinary meetings by which the Society must live, they help greatly to maintain and increase its popularity.

Through death and resignation the Society has lost thirty-one members; and as thirty members have been added to the roll the membership is now 273.

During the session your Council have had exceptionally hard work in connection with the exhibition about to be held. It is to be on a scale never before attempted by any provincial society, and under circumstances the most favourable for a successful exhibition. The use of the Royal Academy National Galleries having been granted by the Lords of Her Majesty's Treasury for this purpose, your Council have reason to expect the exhibition will reflect much credit upon the Society, while, at the same time, it may do much to give a new impetus to photography in our midst.

In conclusion: your Council have to congratulate the Society on its prosperous financial position, as will be evidenced by the Treasurer's report, and trust that the next session will be equally prosperous.

The Treasurer next read his report, which was highly satisfactory, and showed a balance in favour of the Society of £36 19s. 3d., as against £13 10s. last year and a balance on the wrong side in 1874.

Both reports were adopted, and the Treasurer was heartily congratulated on his financial success.

The members then proceeded with the election of office-bearers and Council, and the following appointments were carried by acclamation:—*President:* John Lessels. *Vice-President, Junior:* George A. Panton. *Treasurer:* Colin Sinclair. *Hon. Secretary:* Alex. Mathison, 7, Arthur-street. *Corresponding Secretary* and *Lecturer:* Dr. John Nicol, 16, Warriston Crescent. *Auditor:* A. T. Niven. As *Councillors*, in room of those retiring by rotation and removed to office: Dr. Thomson, and Messrs. Thomas Pringle, E. R. Yerbury, J. R. Crighton, W. H. Davies, J. Annan, F. G. Stoddart, and J. E. Vernon.

Mr. DOBBIE, in moving a vote of thanks to the office-bearers, said he was sure that he might speak for every member of the Society when he said that those on whose shoulders the burden of the work lay deserved the greatest praise for the way in which it had been done during the past year. It was difficult to particularise where all had done so well. The gentle yet dignified suavity of the President had made it always a pleasure to sit under his rule. The zeal and energy of the Secretary had carried him through much ardous work, and the way in which he had devoted himself to the duties of the office had met with universal approval; while the fact that during the Treasurer's term of office the Society had risen from practical insolvency to a state of affluence spoke with no uncertain sound of the way in which his work had been accomplished. He could not help feeling that it was matter for regret that men so eminently fitted for the work of the Society, and with whom all who were brought into contact wrought so harmoniously, were retiring from office, although it was, no doubt, gratifying that they would still have their services as members of the Council. He had much pleasure in proposing a hearty vote of thanks to those gentlemen for their valuable services.

The resolution was carried by acclamation.

Mr. CRIGHTON agreed with every word that Mr. Dobbie had said, and, although not privileged to be behind the scenes, he was quite certain that, from the way in which the business of the Society had been managed, the "rank and file" had efficiently responded to the officers in command. He, therefore, had much pleasure in moving the thanks of the Society to the members of the Council.

The PRESIDENT, while fully appreciating and heartily thanking the members for the compliments which had been showered on him, said that the eulogy was much beyond his deserts. While he was free to confess that he had all along tried to do his duty to the best of his ability, he gladly took advantage of the opportunity of expressing his obligations to the other office-bearers for the uniform kindness which they had shown, and the support and assistance which had always been so freely given to him. He also thanked the members generally for the courtesy with which he had been treated, and the forbearance with which his many shortcomings had been met. This had enabled him to discharge the duties of the office with pleasure to himself, and he would retire with satisfaction in the knowledge that the chair would be filled by one so well qualified as Mr. Lessels undoubtedly was for the work.

The following question was found in the box:—

Given—α. Subject unsteady, necessitating a short exposure to secure sharpness.

Given—β. Circumstances necessitating a stop to secure sharpness and consequent prolongation of pose.

Query—Which will be the wisest thing:—(1.) Omit the stop? or (2.) Use stop and give long *exposé*?

This elicited a good deal of discussion, the outcome of which was that, as under the circumstances a compromise only could be made, the want of sharpness from too large a stop would certainly be much less than that caused by unsteadiness of the object, and the omission of the stop was to be advised.

The meeting was then adjourned.

ANNUAL SUPPER.

THE annual supper in connection with this Society was held on Friday evening, the 3rd inst., at the Albert Hotel, and was more than usually well attended. The newly-elected President being still on the continent, the chair was occupied by the senior Vice-President, Dr. Sidey, Dr. John Nicol doing duty as croupier.

After full justice had been done to the repast admirably purveyed by Mr. Robertson,

The CHAIRMAN commenced the proceedings with the loyal and patriotic toasts usual on such occasions, which were, of course, enthusiastically responded to. In giving the toast of the evening, "Prosperity to the Edinburgh Photographic Society," he (the Chairman) said the members had good reason to congratulate themselves on the present position of the Society. It was then in its seventeenth year, undiminished in popularity, its membership larger than at any former period, and in possession of a substantial balance at its banker's.

The above was followed by "Success to the Exhibition," "Kindred Societies," "Photographic Literature," &c., &c., all of which were very heartily responded to.

The toasts were interspersed by some excellent songs and recitations, and the proceedings were brought to a close with "Auld lang syne" shortly before eleven o'clock.

BRISTOL AND WEST OF ENGLAND AMATEUR PHOTOGRAPHIC ASSOCIATION.

THE ordinary monthly meeting of this Society was held on Wednesday evening, the 1st inst.,—Mr. W. Walter Stoddart, F.C.S., F.G.S., in the chair. The meeting unfortunately taking place on the day of the general municipal elections the number present was, as a consequence, small, many of the members being engaged in connection with civic matters.

The minutes of the former and preliminary meeting having been read by Mr. H. A. H. Daniel (the Secretary) and confirmed,

Mr. Webber, of Bristol, was elected an ordinary member, and Mr. Manfield, of Northampton, a corresponding member.

The SECRETARY having read some letters from absent members, expressing regret at their inability to attend,

Mr. E. BRIGHTMAN exhibited a transparency taken upon the sensitive tissue of Mr. Warnerke, which was certainly to all appearance perfect. He commented upon the mode of development and extreme lightness and convenience of the system.

The PRESIDENT, having examined it, remarked upon the toughness of the film, and demonstrated the fact that it required considerable force to break it. He drew the attention of those present to the great advantage of having the tissue in such convenient form, and compared it with the large excess of weight in as many sheets of glass as layers of tissue in a block.

The SECRETARY announced that he had arranged for some of the papers which were to be read during the session.

After some further discussion upon various subjects the proceedings terminated.

Correspondence.

THE PHOTOGRAPHIC EXHIBITION.

To the EDITORS.

GENTLEMEN,—I see in THE BRITISH JOURNAL OF PHOTOGRAPHY, of September 15, just to hand, that some old prints of mine found their way to the Photographic Exhibition in London, and this without my knowledge or consent.

Allow me to protest against this, and to suggest that in future a written application from the producer, or person authorised by him, should accompany all prints sent in for exhibition, and that none be admitted unless so accompanied.

Amateurs in general are not over careful of the way in which their prints are washed, and I myself have frequently been contented with a jug or two of water poured over them in a hand-basin. Now, how is it possible that such prints, after long keeping, can compete favourably (however much attention may have been bestowed on the manipulation of the negatives from which they were produced) with others fresh from the printer's hands?

I am quite unaware to whom I owe the honour of having been represented at the Exhibition, and write with no desire of causing annoyance, when I feel convinced that none was intended me; but simply as a protest against the fact of photographs being exhibited by any one without the knowledge and consent of their producer.

The abuse to which such a system might lend itself is too apparent to require my saying any more on the subject.—I am, yours, &c.,

Madeira, October 28, 1876. R. MANNERS GORDON.

SENSITIVE GELATINE.—ACTION OF IMPURE WATER ON PRINTS.

To the EDITORS.

GENTLEMEN,—Can you, or any of your readers, give me a formula for gelatine emulsion having, as far as possible, the highest attainable sensitiveness we can hope for at present, irrespective of density, the latter quality being of no importance for the purpose for which I require it?

If anyone has made an extremely rapid emulsion—that is, much more so than ordinary gelatine emulsions—but which he has found useless owing to the impossibility of obtaining sufficient density, I think I can put him and others in the way of preparing very rapid and dense plates if he will not mind taking a little extra trouble in the preparation of the plates. Now I do not wish to raise anyone's hopes to too high a pitch, but I think that if some one will kindly give me a really very rapid formula I can return him a *quid pro quo* in the shape of a plate having the qualities described above. If I succeed it will be by very simple means.

A recent writer in the Journal has stated that sulphates, chlorides, or salts of iron in the washing water destroy the tone of silver prints. Have any of your readers found this to be *generally* a fact? I was rather startled to read such an indictment against sulphate of chloride of lime, which hard water contains so commonly.—I am, yours, &c.,

HERBERT B. BERKELEY.

Cotheridge Court, Worcester, November 7, 1876.

"A MEMBER OF COUNCIL."

To the EDITORS.

GENTLEMEN,—Had I either time or inclination to reply to your "Peripatetic Photographer," I should have suggested that had he even been running he ought to, and could, have read my letter differently to the way indicated by his remarks.

But if he seriously believes that I "started up" to "belabour" "A Member of Council" because of the "extinct volcano" sentence, even had I the opportunity it would be time most unworthily and unprofitably occupied to write one additional word in explanation.

So "'A Member of Council' is certainly laughing in his sleeve;" well, it may be so, though, on the strength of that which I read and hear, I should have imagined that laughing was not a result his letter had accomplished for him.—I am, yours, &c., VERNON HEATH.

43, *Piccadilly, W., November* 8, 1876.

Miscellanea.

HOW SOME EQUESTRIAN PHOTOGRAPHS ARE PRODUCED.—Amongst the advertisements in a German contemporary of photographic "properties for sale" the following is addressed to photographers in towns where cavalry regiments are stationed:—"For sale, a life-sized cast of a high-actioned riding horse, which has been in use for some time in the advertiser's studio. The advertiser wishes to dispose of it because he has no farther use for it, the cavalry regiment formerly stationed at ——— having been removed." Perhaps this is the way in which the Rarey who advertises that, for a fee, he will impart to photographers a means by which a spirited horse can be made to stand perfectly still while being photographed, means to solve the riddle, namely, get a cast of the horse and the cast will stand still enough.

ALKALINE DEVELOPMENT.—After reprinting in *Anthony's Photographic Bulletin* our article entitled *Some Further Notes on Alkaline Development*, Mr. H. T. Anthony adds that in the series of experiments there recorded we have just worked round to the original experiment from the account of which the entire practice of the alkaline development has arisen. It has been stated before, he says, and in this connection may as well be stated again, that the writer having suggested after a successful experiment of his own, to the members of an amateur photographic association to subject the tannin dry plates at that time made to the vapour of ammonia before exposure, in order to increase their sensitiveness, one of the gentlemen fearing the prolonged action of the ammonia might produce fog, exposed the plate first, and then used the ammonia, and found upon examination that the picture was partly developed. The publication of this fact originated the experiments upon alkaline development. Another fact which may be of possible value is the following: our photographer, Mr. Roche, having had occasion to make some negatives of furniture, under-exposed one so much that he decided not to attempt to re-develope it. It was developed on the spot with iron and a wash of water and glycerine, applied for the purpose of keeping the plate moist, so as to be finished in the dark room. This plate was put away in the dark in a plate-box in this moist state, and was lost sight of for a year or more. Upon being brought to light it was found that the developer had continued its action, and the result was an excellent negative.

HOW THE BABY WAS PHOTOGRAPHED.—They came at ten a.m.—the baby, his grandmother, his papa and mamma, and two aunties. They wanted to have his picture taken. The obliging artist got everything in readiness, brought out the little velvet-lined high chair in which babies are usually photographed, and then the troubles began. The baby's papa wanted to take off its sacque because it had such pretty fat arms, but its mamma was afraid that it might take cold. Then one auntie thought it would be so sweet to take off his little stockings and sit him in a big arm-chair, but his other auntie thought that such a performance would be very immodest indeed, and a conflict seemed imminent. Finally it was agreed that they should take the artist's advice and strap him up in the high chair. After much ringing of bells the baby was induced to look with favour on the new state of affairs. The artist prepared to take the negative, but just at the critical moment the infant doubled himself across the strap and screamed lustily. His papa jingled the bells anew, the artist set the music-box going, while mamma drew him out of his chair, and his auntie called him a "putzy utzy little sing." Peace being restored another negative was taken—this time with tolerable success. But one auntie did not like the expression of the face, and the mamma thought that it did not do justice to his eyes. The next time he stuck both fists into his mouth and shut one eye; and the next time his grandma, who had been watching him intently, ran hastily forward and began shaking him and slapping him on the back. It was twelve o'clock. The thermometer stood at ninety-eight degrees in the shade, and the artist ground his teeth and looked to see how far it was from the window to the sidewalk. Three or four more unsatisfactory attempts were made, and at last the baby, who had been taken out of the chair so many times and was not properly secured, slipped down on the floor with a thump. A grand hubbub followed. Everybody screamed; the timid auntie fainted and the papa

swore; while the trembling artist, fearing for his life, secreted himself behind a screen in the corner, where he waited until he was sure that no bones were broken, and then he came forth, saying that he had been suddenly called downstairs to see a man! He was so much relieved on being told that they would not try again that day that he forgot to live up to his rules and demand "pay when the negative is taken." As they started down the stairs the head of the family informed him that they would call again in a few days, and he has hired a small boy to sit at the foot of the steps and bring him word of their approach, so that he may have time to lock the door and hang out a notice—"Gone to the Centennial."—*Omaha Republican.*

EXCHANGE COLUMN.

No charge is made for inserting these announcements; but in no case do we insert any article merely *offered for sale*, that being done at a small cost in our advertising pages. This portion of our columns is devoted to exchanges only. It is imperative that the name of the person proposing the exchange be given (although not necessarily for publication, if a *nom de plume* be thought desirable), otherwise the notice will not appear.

For exchange a number of miscellaneous lantern slides. Send list.—Address, J. H. T. Ellerbeck, 33, Nevill-street, Southport.

A 5 × 4 Ross's instantaneous doublet, equal to new, offered for a quick-acting *carte* lens by any good maker.—Address, G. Bates, 12, Ryland-road, Birmingham.

A pair of 9-inch condensers, in brass mount, will be given in exchange for a half-plate or 8½ × 6½ bellows camera with sliding front; must be in first-rate condition.—Address, S., Hawthorn Villa, Shanklin, I. W.

Ross's No. 6 symmetrical landscape lens, equal to new, offered in exchange for a whole-plate rapid symmetrical or whole-plate rapid rectilinear lens.—Address. K., photographer, Elm Cottages, Hoe-street, Walthamstow.

Wanted to exchange, a lantern, 3½-inch condensers, with argand fountain lamp, and several slides, nearly new, for a quick-acting *carte* or cabinet lens. Difference adjusted.—Address, E. J. Holmes, photographer, Cranbrook.

ANSWERS TO CORRESPONDENTS.

Photographs Registered—

H. Thomson, Perth.—*Two Portraits of the Right Hon. Lord Kinnaird.*

Edward Boot, Leeds.—*Three Portraits of Mr. Samuel Croft, Mayor of Leeds.*

John Owen, Newtown.—*View of the "Castlereagh Clock Tower," Machynlleth.*

G. W. Wilson and Co., Aberdeen.—*Three Portraits of Mr. John Everet Millais, R.A.*

☞ *Correspondents should never write on both sides of the paper.*

Notice.—Each correspondent is required to enclose his name and address, although not necessarily for publication. Communications may, when thought desirable, appear under a *nom de plume* as hitherto, or, by preference, under three letters of the alphabet. Such signatures as "Constant Reader," "Subscriber," &c., should be avoided. Correspondents not conforming to this rule will therefore understand the reason for the omission of their communications.

Wm. Kirk.—The specimens of retouching are excellent.

A. E. Lesage.—As the Almanac required is out of print we shall send you an extract that will suit the purpose.

F. J. W.—Thanks for the extract, which has already, in substance if not in phraseology, appeared in this Journal.

William Weston.—We shall embrace an early opportunity of seeing the periodical from which you have made the extracts. Thanks in the meantime.

The Howarth Stove Company.—A correspondent says that if "A. L. B." will address a letter to Mr. Howarth, Corporation Baths, Thornton-road, Bradford, Yorkshire, he will doubtless receive attention.

D. Scott.—The desired information concerning the preparation and using of oxygen without a gas bag will be found in a recent article on the patented apparatus of Mr. D. Young. As regards the burner write to Mr. F. York, Lancaster-road, Notting Hill, W.

Emulsion.—1. Everything depends upon the strength of the alcohol, not upon the price at which it is sold. If it be sufficiently strong it will answer well for emulsion work.—2. By adding water to the alcohol it may be reduced to the strength your desire. Obtain a specific gravity bottle and you will then be able to conduct your alcoholic experiments with a moderate degree of certainty.

G. B. Renton.—It is scarcely practicable to obtain a magnifying power of a thousand diameters with a half-inch object-glass. The magnifying with an "A" or lowest eyepiece is only a hundred diameters, and the most powerful eyepiece that is in use, viz., the "F," only gives eight hundred diameters. It will be much better if you use an objective of short focus—say an eighth of an inch—with an eyepiece of medium power.

Halifax.—1. Rest assured that the hyposulphite of soda will not crystallise upon the surface of the plates if they be properly washed. But for fixing ferrotypes we should much prefer cyanide of potassium to hyposulphite of soda, owing to the purer quality of the whites thus obtained.—2. You have merely to immerse the prints in a very weak solution of bichloride of platinum until they acquire such a tone as you desire.

Bleaching Effect of Bronze Powder.—We have to thank Mr. Dunmore for one of the finest examples of the destruction of a photograph by bronze powder that we have ever seen. The picture had been mounted upon the lettered side of an ordinary *carte* mount, and the result is that the lettering appears quite white in the photograph, the image having been bleached in the portions corresponding to the bronze letters. This bronzing of the imprint on a *carte* mount should not be tolerated by photographers.

Carbon Prints.—We have received from Mr. Cole, of Teddington, several admirable specimens of printing in autotype or carbon. Mr. Cole has long been known to metropolitan photographers as having been intimately connected for several years past with the preparation and using of tissue in every department to which pigment printing has been applied, and the prints before us attest the skill acquired by that gentleman. They comprise landscapes and portraits from nature, and reproductions of engravings and drawings. Of these we may remark that as a whole they possess a singular degree of excellence, some of the reproductions of engravings rivalling the choice steel proofs from which they have been obtained. There are a considerable variety of tints—from that of the *Liber Studiorum* to the most vigorous and brilliant engraving black.

Destruction of Gas Bags.—Pylos.—This correspondent writes:—"As the winter approaches I have 'looked up' my lantern, gas bags, &c. My best bag leaks, evidently from the action of chlorine inside, although I use a large wash-bottle. Now I find in the Journal for 1866, July 27, under the head of *Foreign News*, that 'it is found that one kilogramme of hypo. will destroy 360 litres of chlorine.' Is this trustworthy? or have you ever tested it?"——In reply: We have not tested this, but there is no doubt that hyposulphite of soda is an "antichlor," as the paper-makers term it. We know of no one better fitted for putting this matter to the test of actual practice than our correspondent, and we hope that he will do so and report upon it. The proper course would be to use two bags, into one of which no oxygen should be admitted save that washed in the hypo. solution. At the termination of a year the comparative results might be ascertained.

☞ **Editorial Communications should be addressed to "THE EDITORS"—Advertisements and Business Letters to "THE PUBLISHER"—at the Offices, 2, York Street, Covent Garden, London, W.C.**

Photography in Court.—At the Bloomsbury County Court, on Tuesday last, the case of Walker *v.* the Great Northern Railway Co. was heard before Mr. Judge Russell. The plaintiff, described as a photographic artist at Hampstead, sued the company to recover two guineas for negligence in not delivering in proper time a case of photographic apparatus which the plaintiff had forwarded from Repton to London by the defendants' train. The plaintiff said he was engaged in photographing a gentleman's mansion near Repton and forwarded his apparatus by train to London, he having to travel in another direction, and expected to find them at his home on his return the following day, where he had other work to do, which he was unable to carry out owing to the delay in the receipt of his camera and other matters entrusted to the company for delivery. The plaintiff called a witness who proved the non-arrival of the goods till the evening of the day upon which they were expected to arrive. This was the plaintiff's case. The counsel for the company urged, in defence, that the plaintiff had given no special instructions to have the goods sent by passenger train, and therefore they were forwarded by ordinary goods train, and that if ordered to be sent by passenger train they would have been forwarded at once. It was urged that, under these circumstances, the company were free from liability. The learned Judge considered the plaintiff had not given special instructions, and therefore he must nonsuit him under the new law, with liberty to sue again.

METEOROLOGICAL REPORT,

For the Week ending November 8, 1876.

Observations taken at 406, Strand, by J. H. Steward, Optician.

These Observations are Taken at 8 a.m.

Nov.	Bar.	Wind.	Wet Bulb.	Dry Bulb.	Max. Tem.	Min. Tem.	Remarks
2	30·37	NW	37	39	50	33	Foggy
3	30·29	NW	42	43	53	38	Foggy
4	30·25	NW	51	52	55	41	Foggy
6	30·23	N	48	51	53	49	Cloudy
7	30·18	NE	38	40	47	37	Fine
8	30·11	N	35	37	43	35	Fine

CONTENTS.

THE BRITISH JOURNAL OF PHOTOGRAPHY.

No. 863. Vol. XXIII.—NOVEMBER 17, 1876.

ON THE LIGHT EMPLOYED IN PHOTOGRAPHIC OPERATIONS.

In continuation of our article in last week's number we shall now proceed to describe the various means adopted to secure the total exclusion of actinic rays from the dark room. In doing so, we have only to consider the question of the best or most convenient screen to be used in connection with the different forms of artificial light mentioned in our last number, whether in the regularly-fitted-up work-room or under the less convenient circumstances of a hastily-improvised developing room *en route*.

As previously stated, wherever gas is at hand it will, at least in the everyday work-room, be preferred to any other form of artificial light, though, whether gas, oil, or paraffine be employed the subsequent conditions to be observed will be identical. Presuming, then, that an ordinary gas jet provides the source of illumination, we have to enclose it in such a manner that, while giving out abundance of illumination in all necessary directions, the whole of the actinic rays are intercepted. Of course it is a matter of the greatest possible ease to cut off the direct rays by placing a sheet of coloured glass or paper before the light; but, unfortunately, this does not answer the purpose in view, for it will be found that the reflected light, falling as it does in all directions upon the walls and ceiling, and again suffering reflection on to the plate, will produce sufficient effect upon the sensitive film to render successful development impossible.

The most convenient, and indeed the general, arrangement consists in enclosing the light in a wooden box or lantern one or more sides of which are glazed with orange glass, proper precautions being taken to secure a current of air sufficient to support combustion without permitting the escape of any rays of light. Such a piece of apparatus presents no difficulty in its construction, and scarcely requires any description; but there are one or two points which, if attended to, add greatly to the convenience and comfort of the operator.

First, as regards its shape: this is generally square, or, at least, four-sided, which is, perhaps, in many respects the most suitable form. With this form of lantern two sides at least should be glazed, so as to throw out light in all directions; but it will depend upon its position as to how many glazed sides are necessary. A most convenient shape, where the light is fixed about the centre of the room—that is, the centre of one side, not pendent from the ceiling—consists of a triangular lantern having two glazed sides. The base is fixed to the wall, while the glazed sides, which meet at an angle of from 100° to 120°, throw out the light in such a manner as to illumine every portion of the room. This will be found infinitely more pleasant than when the light is given out in one direction only, and the greater portion of the work-room enveloped in gloom.

Another point of importance, which we mentioned last week, is the colour of the glass employed, which, as we then stated, need not be of the ruby description. We have on more than one occasion experienced great discomfort while endeavouring to work by such a light, and can testify that, independently of the inconvenience of working in darkness, the strain upon the eyes is so considerable that a permanent impression of discomfort remains for some time after the cause is removed. A full orange glass, which permits the passage of sufficient of the luminous rays to render it a matter of ease to decipher the labels on bottles at the opposite side of the room, may be used with perfect safety with either gas or paraffine, or, indeed, any artificial light of that description. It may be taken, as a general rule, that as the quality of the light employed is lowered so may the density of the glass or other medium be lowered in proportion.

Before quitting the subject of glass we may recall the attention of our readers to a "wrinkle" proposed some months ago by a member of the Liverpool Amateur Photographic Association, namely, the insertion of a sheet of ground glass between the light and the coloured glass in the lantern, which has the effect of softening, and at the same time apparently increasing, the illuminating power of the light transmitted. We have previously spoken of the actual advantage which accrues from the adoption of this simple plan, and take this opportunity of once more calling attention to it. Since our first trial of the plan we have had a piece of the coloured glass itself ground, as suggested by Mr. Wharmby, and we find when used with the dull side to the light a slight additional gain is noticeable. The effect of the ground glass in destroying the irritating character of the orange light upon the eye is most wonderful, and, if no greater benefit be obtained, we can recommend it to our readers on that score alone.

The last suggestion that we shall make in connection with the lantern is one for which we are indebted to an amateur friend in whose "den" we have seen the arrangement at work. It consists in utilising the lantern for drying purposes in addition to its legitimate *rôle*. This is done by fitting the wooden body of the lantern with a conical top or roof of tinned iron, upon the sloping sides of which are soldered strips of metal to form shelves upon which the plates are supported. The convenience of this arrangement will be duly appreciated by those of our readers whose accommodation is not upon the largest scale possible; for, in addition to saving the space that would be occupied by a separate drying oven, there is no necessity for two burners, and the temperature of the room is kept down—a point frequently of immense importance.

Failing a properly-constructed lantern there are numerous substitutes available, all of them more or less useful, but none of them, perhaps, quite equal in every respect to the former. Amongst them may be enumerated various forms of lamps with stained glass globes, coloured paper, or calico frames to fit round the light; and we have even seen an ordinary Chinese paper lantern containing a small wax candle do very good service. The main defect of all these is that no provision is made for getting rid of the reflected light from the ceiling, which, however small its quantity, is extremely dangerous, and if the source of illumination be either gas or paraffine is quite fatal to the highest class of work. It is obviously impossible to completely enclose the light by any of these contrivances without resorting to a greater amount of trouble than would suffice to set up a perfect lantern; hence we may dismiss the substitutes except for travelling purposes, when one naturally expects

to have to submit to a certain amount of inconvenience. When travelling, indeed, we are compelled to fall back upon one or other of the comparatively defective systems, as it is obviously impossible, on the one hand, to carry about a bulky wooden lantern adapted to the purpose, or, on the other, to travel so equipped as to be in a position to surmount any of the natural difficulties which arise.

Again: a paraffine, or even the smallest of "sponge," lamps is a scarcely more desirable travelling companion, so we are compelled to fall back upon a candle and some simple form of screen. The one described by our friend the "Peripatetic Photographer," consisting of three pieces of millboard hinged together, and fitted with a "pane" of yellow calico or paper, will be found decidedly the most convenient. We cannot, however, agree with the "Peripatetic" in saying that the small amount of light emitted from the top of the arrangement may be disregarded; in the majority of cases if a full exposure have been given the negative will probably not suffer, but under opposite conditions, or where from any cause whatever the development is prolonged, the effect of the reflected light cannot fail to make itself evident.

A very simple contrivance, however, suffices to make the "lamp" as nearly perfect as possible. It consists of a double-cased tin cap fitting upon the upper end of the millboard frame when erected, and so arranged as to permit the heated air and smoke to escape, but arresting any stray rays of light. It also serves the purpose of holding the framework together when in use, and when packed away occupies so small a space as to cause not the slightest addition to the bulk of luggage.

Another very convenient and portable arrangement we saw some years ago consisted of a piece of copper tube about three inches long and less than half-an-inch in diameter, bent at a right angle and with one end soldered to a flange about an inch in diameter. The rest of the apparatus consisted of three pieces of stout iron wire about a foot long, a thin disc of wood about four inches in diameter, and a coloured paper bag. When required for use the wires were inserted into three holes in the wooden disc, their opposite ends fitting into corresponding holes in the flange of the bent tube, thus forming a tolerably rigid framework, over which the conical paper bag was stretched. This was worked with a small wax taper, and, while all the smoke and products of combustion passed away by the tube, the bend in the latter effectually prevented any light passing. The whole packed away into any spare corner amongst other articles without any appreciable addition to the weight or bulk of the package.

Many amateurs, when travelling with dry plates, carry with them a tent purely for the purpose of changing and developing their plates. This certainly renders them independent of the dark closets and other similar luxuries of photographic tourists, but adds greatly to the bulk of their *impedimenta*. It is an idea, however, not to be altogether "pooh-poohed," and it may be urged in its favour that the tent may be made available, if of the box form, for packing chemicals, plates, or even portions of the apparatus. For this purpose it is not necessary that the "tent" be of elaborate construction—a tolerably strong box fitted with portable framework and light hood being all that is required; the ordinary camera tripod will suffice for its support, while a jug and a bucket borrowed for the occasion solve the problem of the water supply.

In a less fully-developed form the tent is not to be despised as an adjunct to the dark room in cases where artificial light has to be used, and where, as is the case with very many amateurs, the same room does duty for laboratory and general workshop. We have seen an arrangement consisting of a plain board about thirty inches square, supported upon trestles; this forms the developing table, upon which is erected a permanent hood formed of thin laths of wood covered with brown paper, and fitted with a window. A light curtain to fall round the operator completes the apparatus, and enables us to develope or even to prepare plates in broad daylight in an ordinary room or in the open air. In the developing room, too, by shutting out all extraneous light, it renders us independent of "lanterns" or any other expedient for cutting off reflected rays. Ere the busy season of 1877 commences we hope to have one in full operation.

Outdoor work being at an end until the spring, our readers have time for, and will find profitable employment in, reorganising their arrangements during the winter evenings, and we have penned these remarks as a hint of at least one direction in which they may prepare themselves for the campaign of 1877.

THE SOUTH LONDON TECHNICAL EXHIBITION.

The Technical Exhibition of the South London Photographic Society, which was held on Thursday, the 9th inst., was, we regret to say, very far indeed from being successful. As respects the attendance at the meeting it was all that could be desired, several photographers having come long distances to be present at this annual *réunion*. But the paucity of the bill of fare presented to the audience was almost apalling. Nothing short of the display of the most consummate skill and generalship will ever induce so considerable a body of photographers to attend another "technical" meeting.

It is difficult to assign any good reason for this failure. It is probable that applications and announcements having been made to such as were likely to contribute, matters were then allowed to take their course, those in office trusting that those applications would meet with a liberal response. That such response was not made is now but too evident.

For the future, if these exhibitions are to be continued, it will be imperative that the committee make application to those who might probably aid their efforts practically, and in such good time as will enable the executive to form an accurate idea of what may be expected at least a fortnight or three weeks before the date of the meeting. If necessary, they should then bestir themselves to supply all shortcomings, and with so much effect that the committee may be enabled to publish an attractive programme comprising the leading features of the forthcoming exhibition, so that all who may feel inclined to attend shall be officially apprised of what will be brought forward at the meeting. It accords with the experience of everyone who has had much experience in bringing together a number of photographers at such special gatherings that definite information that at least one or two good and attractive subjects will be submitted to their consideration invariably secures a full attendance; whereas mere hopes of something interesting being forthcoming will only result in an array of empty benches.

THE CAMERA FRONT.

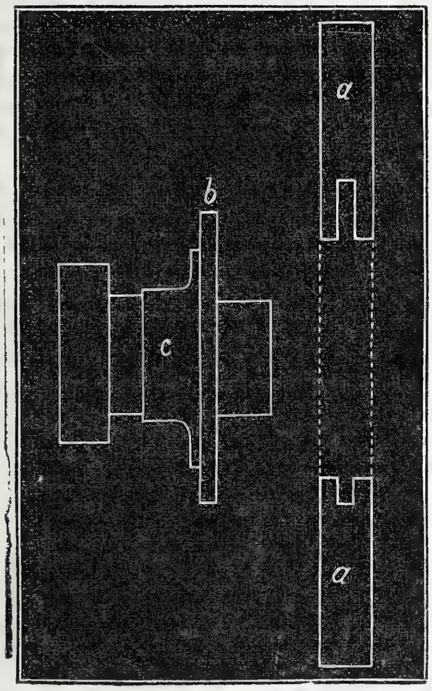
The adapter system, when applied to lenses and camera fronts, is one possessing great convenience. A flange to fit the largest lens in one's possession is screwed upon the camera, and into this is screwed successively one, two, three, or more adapters to suit any required lens, from the largest to the smallest. But the manufacturing of a brass adapter necessitates a resort to the services of an optician—certainly to those of a brass-founder and skilled brass-turner; and, moreover, many photographers dislike having beside them an accumulation of adapters, preferring, instead, to have an independent front. All the best cameras are now constructed with sliding fronts, and this separation of the front—which carries the lens—from the body of the camera renders it comparatively easy to adapt a variety of fronts.

We have recently seen a most excellent and simple method of attaching fronts to cameras, known as yet to very few, but by them much appreciated; and it is from a conviction that this is one of those small things which cannot be too widely known as conducing to the comfort of the photographer, we purpose here giving the details of the contrivance. We regret that, being unacquainted with the name of the designer of this arrangement, we are unable to give him personally the credit which is undoubtedly his due.

Into the front of the camera is cut a square aperture the dimensions of which are sufficient to admit a "front" carrying the largest lens that can be required for use in connection with the camera. Now, if there were a ledge all round and behind this aperture, it is obvious that a "front" carrying a lens might be "shipped" into its place

without any danger arising from leakage or admission of light. This method of fitting fronts is well known to many; but not equally well known are the means adopted for effectively securing the front after it has been placed *in situ.* It is at this stage where the most recent improvement in this direction may be introduced.

Into the solid or permanent front of the camera, we repeat, let there be cut a square aperture of the dimensions indicated, and into the top and bottom of this square let there be cut, into the thickness of the material, a groove of the depth of nearly half-an-inch below, and an inch into, the top. This is represented in the diagram, in which *a a* shows a side view of the permanent front of the camera with the aperture spoken of, and which is represented by the dotted lines. It will be observed that the groove in the top is much deeper than that in the bottom.



In the diagram is also shown a lens *c* screwed upon a square piece of wood *b*, of which an edge view only is presented, and the thickness of which is such as to admit of its being retained in the grooves above and below. The method by which the movable piece *b* is introduced into the camera front will be obvious: the upper end is inserted into the upper or deepest groove of the permanent front *a*, and is pushed up to the top or as far as it will go. This brings the bottom to the level, or a little above it, of the lower side of the aperture, when it is only necessary to press it back into its place and let it drop down into the lower groove, by which means it is fixed both above and below. The weight of the lens renders it impossible for the movable front to leave its place, and unless it do so it is evident that it cannot be detached from the permanent front.

In the camera which we saw fitted in the manner described, and which was intended for plates four feet square, a spring was let into the upper groove so as to keep a strong downward pressure upon the lens-board. This renders "assurance doubly sure," although such an addition is more required in a small than in a large camera, in which the gravitation of the lens is necessarily great. There are, however, other expedients by which the lens-board may be prevented from rising in the groove, the most obvious of which is the insertion of a pin or cam that is brought into action by means of a button on the outside.

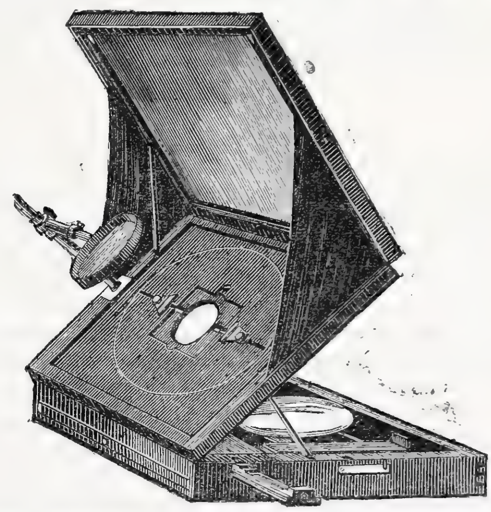
AN IMPROVED RETOUCHING DESK.

Casually alluded to among the few things exhibited at the South London Technical Exhibition is the patent retouching desk of Messrs. Burrows and Colton. The object of our present article is to give a much more detailed description of this appliance than was possible at the exhibition; for it so happened that, by one of those accidents that *will* occur, the specimen sent for exhibition and explanation was discovered at the last moment to be an unfinished one, and not that which had been allocated for the purposes of the meeting.

When recently reviewing the valuable work of Messrs. Burrows and Colton on *The Art of Retouching*, we advanced all that we have to say with regard to the ethics of this branch of our art. We have now only to assume that such department of photographic practice is found to be both desirable and necessary, and, further, that owing to the instructions so recently placed at the service of the public the way to do so is now made clear to the artist. By such assumptions the way is at once cleared to admit of our describing what all who are qualified to speak will unhesitatingly admit is an instrumental aid in retouching which affords greater facilities for the effective carrying out of this branch of the art than any hitherto brought before the notice of photographers.

In the description to follow we cannot avail ourselves of the patent specification, inasmuch as it is not yet available to the public; but we can do better, for, while we write, we have before us the special desk prepared for exhibition, and we are thus enabled to speak of the invention, not as it may be, but as it reality exists.

When packed up this patent desk forms a compact flat box. When opened out it assumes the form shown in the annexed engraving.



At first sight, and when a mere cursory glance is bestowed upon it, the new desk seems to be somewhat similar in appearance to others previously before the public; but on more careful inspection it will be found to possess special features. These we shall notice in detail.

Commencing with the "stage" (a term we take the liberty of applying as a convenient one borrowed from the microscope), we observe that this part—the desk proper—is fitted with brass clamping screws, sliding in grooves, for holding the negative; and these allow so much latitude of adjustment as to admit of even a large negative being securely held. The stage, agreeably with the system in our best microscopes, is so constructed as to be capable of rotating, so that in the event of the retoucher desiring to examine any particular effect in connection with his work he can immediately rotate the stage and turn the portrait upside down.

The lighting is skilfully managed. First of all, there is made to rotate immediately underneath the negative a diaphragm plate similar to that in the microscope, but with this difference—that whereas in the latter instrument the light upon the object is modified by being admitted through apertures of larger or smaller dimensions, in the improved retouching desk the revolving diaphragm plate is fitted with glasses having varying degrees of roughness, from ground glass to fine opal glass. The object of this is to enable the retoucher to impart to the negative any amount of finish thought desirable—from the few touches necessary to stop out the more obvious defects to the elaborate stipple over the whole face now so much desiderated.

The lighting, also, is effected in a manner strikingly similar to that of the microscope. Attached to the bottom board of the

instrument is a large concave silvered reflector, which can be so adjusted as to throw a concentrated beam of light upon the ground or opal glass which forms the backing to the negative which is being retouched. This causes the ground glass to present a relucent, uniform surface possessing great brilliancy, against which the most delicate tint in the negative is instantly perceived and appreciated.

On the left hand side of the desk is erected a strong, round, brass upright, shown in the drawing; and supported upon this is a large and powerful magnifier, the focus of which is as short as is consistent with its diameter. This magnifier can also be adjusted in *every* direction, so as to suit any variety of sight, whether long or short, and to have its axis brought over any part of the negative; for it is both capable of rotating upon its support and also of having its optical axis brought to any distance from the axis of mechanical rotation, owing to a telescopic adjustment in the arm by which the lens is supported.

We have only further to add that on the right-hand side there is a small draw-piece; on this is stretched a slip of glass-paper upon which the pencil is sharpened. There is also a larger drawer in front, of dimensions suitable for holding a number of negatives.

From what has here been said it will be perceived that this the latest addition to the mechanical appliances in connection with photography is so complete as to permit of every variety of adjustment or addition that could have been suggested; and, as the creative faculty shown in these details is unexceptionable, so is the manner in which the conception has been carried into successful application.

The opening meeting of the session will not enhance, we fear, the reputation of the Photographic Society of Great Britain. Two papers were read, and these seemed to be the outcome of a strong appeal made by the Secretary or some other official to the respective gentlemen that they should contribute intellectual food for the members. For having acceded to such a request they are entitled to hearty thanks; but it was impossible to mistake the expression on the faces of the few members who were present when they found themselves listening, in one instance, to a few commonplace topographic remarks about Rome; and in the other to a paper that was essentially elementary, and the keynote to which was struck when the author averred that only a brief period had elapsed since he first became acquainted with collodion. We do not wish to bestow blame, but, on the contrary, commendation, on the gentlemen who so promptly responded to the call made upon them; but the Photographic Society of Great Britain is presumed to hold a higher position among scientific bodies than is implied in the presentation of papers of this class. The former of the two papers might be sufficiently well adapted as an accompaniment to the exhibition of pictures of Rome in the magic lantern; and the latter to the requirements of a few inexperienced juvenile friends banded together in order to form a society for elementary improvement in photography. But such papers could not be considered in place at the opening meeting of a body which, rightly or wrongly, is looked upon as occupying the foremost position amongst the societies devoted to the pursuit of our art-science.

We have received from Mr. Johnston a further supply of his new salt of silver (for which we have to tender him our thanks) in order to enable us to prosecute our experiments at greater length. We have also received another letter, which we publish in our correspondence columns, in which Mr. Johnston gives additional particulars as to the capabilities of the salt and its behaviour in the presence of albumen in emulsion. When we last wrote we were about to try the effect of albumen, as recommended by Mr. Johnston, to improve the structural qualities of the films given by the new emulsion, in which respect we had previously failed most signally, and we are now in a position to give the results of our trials. The first addition of albumen was made as directed in the instructions, namely, in the form of stiff froth, the egg being beaten up without any addition of water. Unfortunately, the result was in no way better than on previous occasions, though absolute solvents were employed and the proportion of water used was kept at the minimum. It struck us afterwards that this negative result might be due to the fact that the albumen was not added to the emulsion until some hours after it was sensitised, and that the liberated ammonia had had sufficient time to exercise a permanently deleterious effect upon the collodion. We therefore prepared a fresh sample, using in this case dried albumen, which was added to the collodion previous to sensitising. After the latter operation had been performed, the mixture was vigorously shaken for a considerable time, in order to prevent the albumen from becoming adherent to the bottle, and an appreciable quantity appeared to enter into solution. The solvent action in this case is undoubtedly due to the liberated ammonia, and not to the presence of water in the emulsion, the coagulating power of the alcohol precluding the possibility of the formation of the aqueous solution. The result in this case was a very marked improvement; but up to the present time the film is not sufficiently free from structure to be practically workable. Though we have as yet been unable to record any success with the new salt there is something about its behaviour which leads us to hope it may be useful. We have, therefore, mixed from the new batch of silver a quantity of *gelatine* emulsion, trusting that in the absence of the injurious action of the alkali upon the pyroxyline the beneficial, or at least the peculiar, effects of the new salt will be recognisable. So far as the preparation of the emulsion goes there is no difference between the double salt and silver nitrate, but the appearance of the emulsion is decidedly encouraging. The film it gives upon glass is by far the finest and richest in colour we have ever seen, even with gelatine; but whether it will work up to its appearance remains to be seen. We may remark that the emulsion possesses a most powerful odour of ammonia. We intend, as soon as possible, to test the silvering properties of the salt, but scarcely see that it can possess any advantage over nitrate.

THE REV. F. HARDWICH ON THE LIME LIGHT.

Some time since I wrote two or three short articles in this Journal on oil illumination for the magic lantern. Hoping to be of some use in smoothing the path of beginners, I now send my experience with the lime light. The process which I have chosen as the most simple and perfect is the "oxyhydrogen," and to this I shall mainly confine myself in the following observations.

The Preparation of the Oxygen Gas with Chlorate of Potash and Oxide of Manganese.—After a whole season's experience I met with a series of mishaps, to which I may here allude. On one occasion the india-rubber tubing burst suddenly with a sharp explosion, and on looking for the cause I found that the inside coil of wire had become rusted between the cooler and the bag, and that the tube was nearly obliterated. Since then I have always blown through the apparatus from end to end before commencing, to satisfy myself that the gas has a free passage.

My next misfortune was due to the chlorate of potash. I had purchased a fresh sample at a higher price, and it was, if I may so say, *too pure.* On a very moderate application of heat the gas came off with such violence that a five-feet bag was filled in three minutes, and a portion of the water of the purifier was driven completely through. On consulting my manual of instructions I saw the presence of lampblack in the manganese suggested. I therefore secured myself against that source of error by collecting the same manganese and using it a second time. Still the oxygen passed off in a most tumultuous manner, filling the bag in five minutes and forcing up the water. I then *dried* the chlorate and manganese beforehand in an oven, thinking that the vapour of water rising in the retort might facilitate the escape of the oxygen. Next I purchased a new sample of manganese, but the same thing happened—either the gas ceased coming off, or it came off with a rush. I then picked out the larger crystals of chlorate and rejected the fine and powdery part, using, as before, half-a-pound of black oxide of manganese to a pound and a-quarter of chlorate. The action was decidedly less rapid, but still too quick to be safe. In seven minutes the bag was three-quarters full and the bubbles ceased. On raising the heat to redness the action recommenced, and the bag gradually filled in seven minutes more.

I now paused to consider what I should do next, and determined to adopt a different plan altogether. Instead of using the crystals and

rejecting the powdery part I began by pulverising the whole pound and a-quarter of chlorate in a porcelain mortar. I then mixed it with *half the usual quantity of manganese* and applied a gentle heat. The success was complete; bubbles of oxygen began immediately to come over and continued to do so regularly, until in twenty minutes the bag was distended to a drum-like tightness. On lifting the retort the bottom showed no sign of redness, but was quite black. Thus I obtained the maximum of gas at a low temperature, and the washing process was thoroughly under control.

The sum of the whole matter is this—that whereas some fix one-half and others a third as the proper proportions of manganese, the best rule to follow is *to be guided by the evolution of oxygen*, and if the gas come over too quickly at a moderate heat to use less of the black powder. With pure chlorate of potash a fifth part by weight will be abundantly sufficient.

I have been asked to explain the occasional presence of chlorine in the oxygen, corroding the tap and rotting the bags. The use of impure chlorate has, I suspect, much to do with this. I have picked out quite a small heap of bits of stick, straw, &c., from commercial chlorate of potash; and, by mixing a small quantity of soot from the back of the chimney with chlorate of potash and manganese, and deflagrating it in a spoon, anyone may have nasal proof of abundant evolution of chlorine. A lump of washing soda in the water of the cooler will absorb traces of chlorine; and to convince myself of the purity of the oxygen which I use, I have *breathed* it from the bag for ten minutes without any sensible irritation of the air passages. In my experience the taps have been more frequently corroded by water driven through the cooler when the escape of gas is too rapid; but I have latterly prevented this entirely by using two purifiers and drilling the last inch of the delivery tube in the second with ten or a dozen small holes of a sixteenth-of-an-inch in diameter. The oxygen is in this way also more thoroughly washed than would be possible with one cooler only.

The Hydrogen.—In place of hydrogen I use coal gas of an impure kind. It is made for the use of miners at the mouth of the pit, and is often distilled simply from the coal and passed into the gas-holder without any washing either with water or milk of lime. The smell is, in consequence, very ammoniacal and offensive. To purify this gas I took an ordinary cooler of the same form as that employed for oxygen, and filled it quite full of small fragments of caustic potash mixed with coke. The gas was allowed to pass slowly through, and when collected in the bag was nearly free from odour. Tar, watery vapour, ammonia, carbonic acid, sulphuretted hydrogen, traces of cyanogen, and of liquid hydrocarbons remain behind in the purifier. When lighted at the jet the gas was found to have lost much of its illuminating power, but it gave a very intense heat when burnt with oxygen. Judging by the eye it appeared to me that the light on the screen was somewhat better than before, but not sufficiently so to recompense me for the trouble which I had taken. Evidently the purity of the coal gas is of less importance than that of the oxygen.

The Burner.—The next point to be considered is the *jet*, and in this matter I have followed advice given me by Mr. H. Cooper, of Northampton, and have made the hole larger than usual. A large orifice (·05 in.) to the jet and a moderate pressure on the bags has, in my hands, given the best results. I am aware that an objection is made to moderate pressure, on the plea that it does not ensure a thorough admixture of the gases; but probably this would depend upon the internal construction of the burner. In my instrument the oxygen is introduced through a small nipple pierced with *eight* holes of the size of a fine needle. The gases mix perfectly when fifty-six pounds are placed on the bags, and the only objection is that if you turn down the flame very low you cannot always keep it at the mouth of the jet. Sometimes it will pass back into the chamber behind with a smart click and extinguish itself. This, however, does not occur when the flame is kept uniformly at a fair height. I presume I am right in saying that in the oxyhydrogen process the light increases with the amount of gases consumed in a given time, and that, whether you force these gases through a small orifice by high pressure or through a larger hole by low pressure, the result is the same *up to a certain point.*

A word as to the supposed danger of the gases passing the wrong way in the oxyhydrogen process and so causing an explosion. You will see at once that this danger must of necessity be lessened by using low pressure and a large orifice to the jet. In truth, however, I believe the danger has been much exaggerated. On one occasion the pressure-boards of my hydrogen bag were placed too near to the wall, so that the upper board carrying 112 lbs. grated against the plaster as it descended. Being much absorbed in my subject I did not observe it for a time, but, finding the supply of hydrogen getting less and less, turned off a portion of the oxygen to correspond, until at last I could keep up the balance of the gases no longer, and the light went nearly out. On looking round I was alarmed to see that the pressure was almost entirely off the hydrogen bag, and that for a quarter of an hour at the least the bags had been unequally weighted. Theoretically one would have expected the oxygen under such circumstances to force its way backward into the wrong bag, but nothing of the kind happened, and after removing the hydrogen board further from the wall I continued my lecture to the end. This incident is mentioned, not to encourage carelessness in any way, but to show that with ordinary precautions no fear need be entertained.

The Lime Cylinder.—I have used both soft and hard limes in this process, and have found the former to give a somewhat better light. The rapid drilling into holes under the action of the gases is, however, an objection when no assistant is employed, as it necessitates a more frequent turning of the lime. At present, therefore, I put a few more pounds on the bags and use the hard limes.

The *small* cylinders have an advantage over the large in being more easily adjusted, but many of them are not properly centered, so that it is impossible to keep the jet at a fixed distance from the lime during the rotation. Another difficulty is that the screw is sometimes so fine that after one revolution the flame impinges on the same spot a second time. It should be a *coarse* screw, as you suggested in a recent number, so as to raise the lime during its rotation. I find, further, that in turning these small cylinders the bright spot comes round to the eye and blinds it for a moment. For these reasons I have returned to the large limes after having for a while discarded them; and by keeping the flame near to the edge any loss of light due to the bulk of the cylinder may be avoided. Each lime will last for two lectures, and by rubbing it down on sand-paper I have used it four or five times, but, probably, with a little loss of light.

In adjusting the lime the general directions are to bring it as near to the jet as you can without touching; but I have found that if nearer than an eighth-of-an-inch, or thereabout, the flame will sometimes become *forked* against the edges of the cup drilled in the lime, and will then strike off at an angle towards the condenser. There is no gain of light by approaching too near, although anything like a blowpipe action at a distance is to be avoided.

In judging between upright and slanting limes I am inclined to give the preference to the former. At all events the slant should be a moderate one, and not so great as to throw the light mainly upon the lower edge of the condenser, as I have sometimes seen. It seems to stand to reason that the spot should *face* the centre of the condenser, and not be looking at it edgeways.

The Lens.—French portrait lenses of the quarter-plate size are usually recommended, but I have found some of these lenses quite unfit for the purpose from curvature of the field; the centre and edge of the picture cannot be brought into focus at the same time. It would be better to construct lenses purposely, in which flatness of field should be the main consideration. I am now using one of Derogy's half-plate objectives of six inches focus and two and a-quarter inches diameter. The definition is perfect up to the very edge, but no gain of light from the increased size of the aperture. The condenser throws the rays in the form of an elongated cone upon the central part of the glasses, and you may introduce stops one after the other until the aperture is no larger than an inch and a-quarter without in the least affecting the disc.

In conclusion: I have only to say that I do not write this communication for the professional lecturer, with an audience of 600 or 700 people, but for the amateur, who will be content with pictures of a moderate size. My own feeling is that *extreme brilliancy* is of much more importance than size of disc, and I have no fear of any complaints being made if the pictures are well lighted. The schoolroom in this colliery village is sixty-five feet long, and will hold 350 people; they can all see both hymns and pictures, even at the extreme end. I lecture for two hours or a little under, and load the bags with half-a-hundred weight when the limes are soft, or with three-quarters in the case of hard limes. If it is intended to continue the lecture for a longer time, and to burn the gases down to the last quart, I provide myself with a heap of bricks, and pile them on at the very end; each brick may be reckoned at seven to eight pounds in weight.

One point more should be mentioned: all the taps are to be turned on full. To work with the taps partly off is to impede the flow of the gases, or, in other words, to reduce the pressure, and as I use low pressure I cannot afford to reduce it. There is this further advantage in having the taps fully open—you know exactly how long your gas will last; whereas, if the bags are loaded with a

hundred weight, and the taps partly closed, it often happens that you miscalculate, and in your anxiety not to use too much gas you leave a cubic foot or more over at the end of the lecture, and in that way lose much of the light. The oxygen tap I keep open to the full extent from the beginning of the lecture to the end, and move the hydrogen tap to regulate the proportion of the gases. There must be no excess of oxygen, but a *very slight* excess of the coal gas, tipping the flame with red, will do no harm. When both gases are pure I obtain the best results, however, by keeping an exact balance, and allowing no excess of the coal gas.

To be absolutely safe from leakage the connecting tubes should be tied with string. F. Hardwich.

MODIFIED DRY-PLATE PROCESS.

A modification of the simple iodised collodion process—the first of all dry processes—has recently been published in the *Association Belge de Photographie* by Dr. H. Vogel, the leading points of difference consisting in the formation of bromide of silver only without any iodide, the absence of tannin or other preservative, and the development of the image by the alkaline process.

The collodion employed in this process is composed in the following manner:—Having prepared a stock solution of plain collodion containing nine grains of pyroxyline in each ounce it is salted by being mixed with an alcoholic solution of bromide of cadmium (which must previously have been prepared and filtered) in the proportions of—

Plain collodion	90 parts.
Alcohol	30 ,,
Bromide of cadmium	2 ,,

Although nothing is said concerning the nature of the pyroxyline to be employed, it must, no doubt, be one which gives a porous, non-contractile film.

Plates coated with this collodion are sensitised by being immersed for five minutes in the following:—

Nitrate of silver	60 grains.
Nitric acid	1 minim.
Water	3 ounces.

The plates, having been sensitised, are carefully washed and dried, no preservative being applied. They are much less sensitive than those prepared by the wet collodion process, as they require four times the exposure.

The development is effected in the following manner:—Pour over the surface a little alcohol, and, after allowing it time to permeate the film, rinse the surface until all greasiness disappears, and then apply *quant. suff.* of the following:—

Alcoholic solution of pyrogallic acid (10 per cent.)	8 minims.
Ammonia	3 ,,
Solution of bromide of potassium	1 minim.
Water	4 ounces.

If the plate has been sufficiently exposed the image appears immediately and gradually acquires intensity. The fixing is effected as usual.

The special advantage claimed for plates prepared in this manner is a greater degree of delicacy and perfection than if a tannin preservative had been employed. Those who are familiar with Major Russell's tannin process will recognise in the exposure here recommended by Dr. Vogel a very great increase to that to which they have been accustomed.

PAPER AND EMULSION NEGATIVES.

[A communication to the Technical Meeting of the South London Photographic Society.]

Paper Negatives.

I think a few words will not be out of place at this meeting on the subject of reproducing negatives the same size as the originals when a large number of prints are required, which I have successfully adopted in my own practice, giving results equal to collodion negatives on glass. A negative and print by this method I will now pass round for your inspection, and I think you will all agree with me that the results compare favourably with prints from the original negative. I proceed thus:—

A transparency is made in the ordinary way with carbon tissue developed on glass (made from tissue prepared by the Autotype Company expressly for transparencies). The transparency must be perfect, namely, *bare glass* for pure whites and intense blacks for the shadows, and the corresponding gradations between these two extremes. When perfectly dry a paper negative is printed from this in the printing-frame, in the ordinary way, on either *thin* Saxe or Rive albumenised paper, salted with not less than ten or twelve grains of chloride per ounce, and sensitised on a sixty- or eighty-grain nitrate bath. (The paper used must be thin—medium Saxe or Rive will not do.) Print as deeply as possible, so that by reflected light the shadows in the negative are a little tinted; a few printed of different depths from the same transparency will impart experience better than I can describe in this short paper. I prefer to pass them through the toning bath slightly, but they must be kept of a brown colour. Fix, as usual, in hypo.

When dry, the resulting paper negative requires to be waxed, to render it as transparent as possible, with either pure white wax or, as I myself prefer, a mixture of Japan wax and solid paraffine, which is far cheaper. Lay the albumenised surface down on a warm glass plate, and scrape over it shreds from a lump of the waxing composition, and then with a hot plastering-iron (the same as is used by the chemists for spreading plasters) spread the wax evenly, so as to saturate the paper perfectly. I like to leave plenty of wax on the paper (as it keeps the grain of the paper from showing), and not to iron it out between blotting-paper, as some recommend.

When cold and hard print from it in the ordinary way in the printing-frame (using a clean glass plate as a support) in a good light—the brighter the better, but avoiding sunlight, which would melt the wax. Prints printed in a weak light have a tendency to show the grain of the paper of the negative.

I may add that the transparency may be made in the camera, on collodion, but for negatives of the same size I prefer carbon tissue.

Enlarged Paper Negatives.

The negative I now pass round is enlarged from a quarter-plate, taken by the bromide emulsion process (collodion). The transparency requiring to be larger than the original must, of course, be made on collodion in the camera. When the negative is an enlarged one I prefer to use a plain paper (not albumenised), which is now to be obtained in the market, answering every requirement for this process, as greater depth can be more easily obtained. The after processes, such as fixing, waxing, &c., are the same as described above.

Emulsion Negatives.

I have during my photographic career attended a great number of meetings and have seen but very few emulsion negatives exhibited. I think that now, as we have here so many gentlemen from the country, it may gratify some of them in looking at the negative I now pass round.

In connection with emulsion negatives, I have heard a great many say that it is very difficult to get detail in the shadows with collodio-bromide emulsion. I think the negative now being passed round will quite disprove these assertions. The subject photographed is a most trying one, taken in broad summer sunlight, being an Armstrong gun on its carriage, with wooden sheds and heavy shadows. These shadows are full of detail.

I am sure you will all agree with me that it would be a most trying subject for a wet plate, as regards solarisation, when the light falls on the top of the gun. In this negative, instead of being solarised, it is soft and yet brilliant, and the heavy shadows under the gun are extremely full of detail.

I feel convinced that if my brother photographers would only take up this beautiful process, and work it with a will, in time we should soon get rid of the nitrate bath, and also the smell of collodion in the studio, to which so many object. William Brooks.

ON THINGS IN GENERAL.

In the *South London Press* will be found an account of a "new thing" in napkin rings. "The rings are electro., and for about one-fourth of the circumference are double, the outer portion having an oval opening. The narrow space left between the two is just sufficiently wide to admit a photograph—say, the head and shoulders of the ordinary *carte* size—the oval opening, of course, forming the frame of the photograph. The rings are sent out fitted with the portrait of some celebrity; but there is no reason why a whole family should not have photographs of themselves inserted, and have the gratification of staring at their own 'counterfeit presentments' while they eat their dinners. Truly, this is an age of progress." Progress, indeed! —buffoonery!

I thought the discussion on the Photographic Exhibition had been exhausted; but it is not, by any means. Epigrams are edged, and sometimes barbed, weapons, and the celebrated "extinct volcano" rankles yet. Nothing is more painful to one's physical frame than the admission into the eye of particles of dust, and, as volcanoes emit such mole-

cular annoyances, we must in charity suppose that something of the sort occurred to the mental eyes of a gentleman who "fails to see how he has infringed the advertised rules relating to the exhibition;" for, to the ordinary observer, the words "all labels, names, particulars of processes, &c., must be placed at the back of the picture" would be conclusive as to the intentions of the framers, and to quote the rule stating "no name or any information will be allowed to remain on the *glass* or *frame*" as a justification for placing a name on the mount and not on the glass, and failing to see how he has infringed the advertised rule relating to the exhibition, appear, to me, very like an attempt to throw dust into other eyes. No one but deplores the respected name of Bedford being dragged into this controversy; nor the less is it felt that Mr. Gordon's letter, worded with the true instincts of a gentleman, reveal a something which would not appear to bear the light of day to put it in words at which no one could take umbrage.

I must take my leave of exhibition topics in referring to the communication of "A Non-Exhibitor," who writes what all may read and approve of, except his criticism on hanging—wherein he shows himself not a proficient, to put it mildly—"relieved here and there by a few good, cleverly-treated pictures that were unfortunately hung side by side with others of such a different character and poor quality that in attempting to leaven the whole the few are seen to great disadvantage," It is a new theory that good pictures are spoiled by the immediate propinquity of bad ones. It is usually considered that inferior pictures in close juxtaposition to good ones serve as a foil, and show the excellences of the latter.

This month has afforded the English journals a good crop of extracts from the American ones. I would especially commend for careful perusal an article by L. W. Seavey, a very clever scenic painter, on the use of backgrounds in securing pictorial effects. There is sterling solid food to be had out of the reading of it, and the advice it contains is all the more useful as coming from "one who knows." Nevertheless, Mr. "L. W. S." does not hesitate to raise a laugh at his own expense: he tells how he once painted a background to order which was used upside down when it arrived at its destination under the idea that the artist's intentions so required.

We learn, too, from the same journal of the adventures of a half-developed, under-exposed plate; after *twelve months'* (!) soaking with glycerine it became a properly-exposed, duly-developed negative of excellent quality.

Perhaps the most marvellous process—one brought under the attention of the Chicago society—is that for producing Mr. Smith's magnetic negatives. To give an instance of its powers he places his negative before the eyes of his sitters and apparently makes all trace of an image disappear by immersing it in a certain solution. "He then flowed the plate with another solution, bringing back the likeness to just the point wished, claiming that by putting them through solutions Nos. 1 and 2, and reducing them all (good and bad negatives) to the same level, he can then with solution No. 3 bring them up to excellent quality, and can make solar negatives of an intense harsh one, or make a splendid negative for contact printing from a solar one. The negatives were all served the same, and pronounced by the many learned ones present superfine, the printing qualities being magnificent. The process as a whole was pronounced wonderful." More conjuring! "Ladies and gentlemen, there is no deception—only walk up and pay your money." Again: need I add that the process is patented? American photographs usually possess great merit, and no doubt we now discover that the reason is the attention given to electric phenomena. Turn we to the American Institute proceedings for further proof. A Dr. Ott, having given a lucid account of the carbon process, is forthwith questioned as to details. Dr. Miller had some tissue "as insensitive as sheet iron." Mr. Chapman said "if the negative used were perfectly black no impression could be made though it be exposed for a month." (I wonder how he discovered this.) He then inquired what change took place when the gelatine was decomposed by electricity during a thunderstorm. Dr. Ott thought something like the effect on sour milk. Then the President inquires how the paper is effected. And so on. The puerility of such tall trifling is too absurd for comment.

Pending another gathering of these very wise men, it might be well to formulate a few questions ready for discussion at their next meeting. What would be the effect of sneezing, coughing, and winking? and how would it be if the cat went by or if a cow looked over the wall? Notwithstanding all this absurdity, it is evident that carbon is slowly working its way to the front. Let us hope that the days of permanency are at hand.

FREE LANCE.

ON LANTERN TOPICS.

As we are now on the eve of another "lantern season" I have thrown together a few observations and suggestions on matters pertaining to the lantern, which I think, perchance, may prove of some service to intending purchasers of slides and apparatus. May their name be "legion!"

Thanks to the able advocacy of the Editors of THE BRITISH JOURNAL OF PHOTOGRAPHY the lantern has become thoroughly popularised, and its arrangement generally well understood, by photographers—amateur and professional. The latest improvements in its construction or mode of lighting have been duly and minutely reported; and, perhaps, what have been productive of the greatest benefit have been the elaborate editorial critiques which have appeared from time to time on the various sets of lantern slides sent by their producers for review.

The complaint raised some two or three seasons ago of the paucity of subjects for the lantern in the market has been in a great measure, if not entirely, removed—although even now some charming and picturesque regions remain unrepresented—and the catalogues issued by the leading producers in the trade may now almost be termed voluminous. Nevertheless, there still remain certain *desiderata*, and the first subject which arrests our attention (painfully in some cases when engaged in overhauling our stock of slides before commencing the winter campaign) is the question of permanency; for, unless the public can be assured of this quality in the slides now offered for their selection, they will soon cease to be purchasers, and a "great blow and discouragement" will be inflicted on the lantern as an educational as well as purely recreative instrument. That the mechanically-printed and carbon slides are permanent we are all well satisfied; but we could wish to be as certain of those camera-printed pictures of most beautiful tones which may now be seen by scores in the shop windows.

The whole question of permanency of these pictures rests entirely on the method of toning and fixing adopted in their manufacture. I think it may be asserted, without fear of contradiction, that all mercurially-toned transparencies are *bound* to fade sooner or later; and yet, with the full knowledge of this most disagreeable fact, this very method of "blackening" lantern slides is still in vogue. Until mercury and hypo. are discarded I fear we shall have no reliable lantern pictures. I think one nearly as bad as the other. Toning should only be effected by means of chloride of gold, bichloride of platinum, chloride of copper, and alkaline pyro., as advocated by our Editors (and which answer admirably every purpose), or by palladium, as recently recommended by Mr. Ross, and fixing solely by cyanide of potassium, except in those cases in which the prints are on albumen, when hypo. must be resorted to.

I have, however, in my possession scores of slides printed on albumen and collodio-albumen (by superposition) many years ago, fixed with hypo. and toned with gold, which are as perfect in tone and quality as the day they were made. I also have tannin and honey and coffee plates which received no toning treatment at all, save a liberal dose of citric acid in the developer. These, too, were fixed with hypo., but in colour and condition they leave nothing to be desired. The hypo. in these instances has been very carefully removed by thorough and prolonged washing. But on looking through a lot of "commercial" slides, purchased from one of our leading manufacturers a few years ago, I find cases of incipient fading and deterioration frequent, and one and all referable either to mercury or hypo. A few samples of these, culled at random, I send for your inspection.*

At the present moment the market is stocked with a series of continental views published by one of the first and oldest Parisian photographic firms, and one which, under the former proprietors, enjoyed a world-wide celebrity for the beauty of its stereographic transparencies. These pictures, exquisite in tone (as transparencies simply), are evidently cut from stereo-"*wasters*" (measuring $3\frac{1}{4} \times 3\frac{7}{8}$), and when unmounted or dissected will be found, in most instances, to embrace a portion of a second picture, with a diamond cut running between the two. One and all of these pictures, I have reason to believe, are toned with mercury. "*Emptor caveat.*" They have also another great failing: many of the architectural subjects are taken with a tilted camera and a landscape lens. Barrel-shaped distortion is very apparent. Thanks to swing-backs and rectilinear lenses British productions are free from these serious drawbacks to pictorial effect.

Last winter, during a lantern lecture of a most interesting kind, a very fine but very distorted architectural picture was thrown upon

* These are in a truly lamentable condition; some portions of the image, in consequence of having faded, are nearly invisible, while others are still forcible and black.—EDS.

the screen, and the lecturer for the evening, after announcing the subject (never having seen the view before), paused for a moment to admire it before proceeding with his reading, when lo! a small deity in the rear instantly interpolated, "*during an earthquake!*" followed by roars of irreverent laughter. The mental disquietude of the reverend lecturer induced thereby may be better imagined than described.

It is to be regretted that a "universal" or "standard" size should not be adopted both for lantern pictures and lantern condensers. The size of glass, style and shape of mounts, circles and cushion-shaped, as adopted by the Woodbury Company, I think admirable. In reference to the lantern, nothing can be better adapted for home or drawing-room exhibitions than the sciopticon, burning mineral oil; although I must confess I personally prefer the very even illumination afforded by the Silber lamp in the lantern. When the latter form of lamp is selected the lantern should be capacious and freely ventilated. A large packing-box, which will contain all the apparatus required, forms the best lantern I know of. All the present lime-light lanterns are too smart and too small for burning the Silber comfortably, as it possesses great heating power, although, I believe, when well ventilated, it is perfectly safe and most easy to manage.

The condensers should be well centered, and not less than *four inches full* in diameter, or the corners of many rectangular or cushion-shaped pictures will be cut off, producing a very unsightly appearance on the screen. For public entertainments the oxyhydrogen or lime light remains supreme. I trust shortly to be able to furnish a brief report of some trials I have been recently making with various forms of "artificial lime cylinders." SYNTAX.

FOREIGN NOTES AND NEWS.

THE EXHIBITION AT MUNICH.—ON THE ENGAGEMENT OF ASSISTANTS.—PROBABLE CAUSE OF THE RETICULATION OF CARBON FILMS.—TO RETOUCH LICHTDRUCK PLATES.—ELASTIC VARNISH.

AMONGST the articles eligible for exhibition at the late Exhibition of Art and Industry at Munich photographs were included, so that a few words on the subject, gleaned from the reports of Herr Prümm to the Photographic Society of Berlin, and Dr. Vogel in the *Mittheilungen*, may not come amiss. The exhibition was not very extensive, being more a sort of temporary supplement to the Munich National Museum than an independent undertaking; but, on the whole, the quality of the exhibits was good.

Herr Prümm was much struck with an enlargement by Herr Hannfstängl, which was said to be absolutely free from retouching—whether by that is meant that the original negative was untouched or merely that the enlargement was not worked up is not specified—and two new processes called respectively "pyrography" and "eidography," but further inquiry elicited the information that they were in no way connected with photography. The pyrographs exhibited by Herr Schurich were large drawings upon wood, having all the appearance of being burnt-in by means of a burning-glass, and of being intended for the decoration of panels. The eidographs of Herr Eckhardt, of Munich, were reliefs produced by some peculiar process, and consist, first, of plates of some unrecognisable material in very high relief, and, secondly, of others in which the lines are sunk much deeper than in ordinary etched plates. Amongst the novelties observed by Dr. Vogel were pictures by Scherer and Co., of Dresden, which occupied a sort of middle place between photography and drawing. They consisted of a number of *genre* pictures composed from life and arranged in a sort of arabesque round a poem, which they illustrate much after the manner of the illustrated rhyming tales in the *Hansfreund.* There were also some specimens of glass printing from the State Printing Establishment at Berlin, and burnt-in enamels, by Leisner. These last met with no award—a circumstance which afforded Dr. Vogel no little astonishment; indeed, on the whole, he was very much dissatisfied with the result of the awards, and probably not without reason, seeing there was not a single professional photographer on the jury. Six medals of the first class, eight of the second, eleven of the third, and fourteen diplomas were awarded.

Apropos of the Berlin Association of Photographic Assistants Herr Marowsky recommends masters to agree amongst themselves to employ no assistant who cannot show a letter from his last employer testifying that he has not omitted to give proper notice, as the only way by which masters can grapple with the ever-increasing evil of trained hands leaving their work at a moment's notice. Herr Marowsky's advice is, no doubt, sound; but, unfortunately for themselves, masters never seem able to bind themselves down to a plan and to act in concert as the men do when they enter a trades' union, and many employers are glad to get a trained assistant without inquiring too particularly as to why and when he left his previous situation, forgetting that they themselves are likely to be the next sufferers.

Dr. Schimann, of Pesth, says that he has lately examined under the microscope a piece of carbon tissue which presented the appearance of shagreen; he then saw that such appearance was caused by a network of minute rents in the carbon film. The explanation of the phenomenon is something like the following:—During the development the water penetrates between the skin of collodion and the carbon film and rends one or the other film like a net. The water then, also during the development, takes up mechanically a quantity of pigment, which it deposits in the canals or openings in the film made by the rents, and so makes them visible to the eye. In order to avoid these rents the editor of *Moll's Notizen* recommends leaving the prints rather longer than usual in the cold water in which they are placed when removed from the printing-frame, and letting the picture lie for a short time on the glass after the squeegee has been passed over them and before developing; also the use of only moderately warm water for developing.

According to Despaquis dark spots or parts in lichtdruck plates may be lightened by treating them with ammonia or chloride of lime. Further: one can make additions to the drawing by means of a very weak tannin solution, which coagulates the gelatine. In this way one can add titles, inscriptions or ornaments, and the stronger the tannin the more intense will be the colour.

An excellent elastic varnish for photographic prints may be prepared as follows:—Crush transparent and clear pieces of dammar into powder, and place about forty grains in a flask; pour upon it about six ounces of pyro-acetic spirit, or acetone, and expose the whole to a moderate temperature for about two weeks, during which time it should be frequently shaken. After this time has elapsed pour off the clear saturated solution of dammar, and add to every four parts of this varnish three parts of rather dense collodion; the two solutions are then mixed by agitation, the resulting liquid allowed to settle, and preserved in well-stoppered bottles. This varnish should be applied, by means of a soft camel's-hair pencil, in vertical lines. At the first application it will appear as if the surface of the print were covered with a thin white skin, which, however, changes into a clear shining surface as soon as the varnish has become dry. It may be necessary to apply it in two or three layers. A very good quality possessed by this varnish is that it retains its high gloss under all conditions of weather, and still remains elastic.

Meetings of Societies.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.

THE first ordinary meeting for the session was held on Tuesday last, the 14th inst.,—Mr. J. Glaisher, F.R.S., President, in the chair.

The following gentlemen were admitted as members:—Messrs. G. Nesbitt, A. Oeffelein, E. W. Andrews, J. S. Hazard, and W. Shuter.

Several pictures, by Mr. F. N. Broderick, Jun., Ryde, showing the destruction of trees and houses in the Isle of Wight by the tornado of September 28th, were exhibited.

A number of portraits, by Mr. Valletto, of Mexico, were exhibited by Mr. W. Harrison, of Paris, who was introduced to the meeting by the Chairman, and to whom was accorded a warm welcome.

Mr. HARRISON observed that Mr. Valletto was a photographer of the old school, who would not retouch a single negative, but produced all his effects by skilful management of the light.

These specimens were admirably executed, and were printed in carbon by Mr. Harrison, Jun., son of the exhibitor. In reply to a question with respect to the high finish of the surface, and *apropos* of a suggestion by Colonel Stuart Wortley that they had been printed by the Lambertype process,

Mr. HARRISON said they had been printed by a carbon process constantly used by him since 1859, and, consequently, long anterior to the introduction of the Lambertype process. He (Mr. Harrison) also exhibited a number of effective carbon prints, reproductions of clever sketches of rustic life and character, by M. J. F. Millet.

A paper by the Rev. W. A. Crofton Atkins, *On a Recent Tour in Italy*, was then read by the Assistant Secretary. It contained nothing of photographic interest, and no discussion followed.

A paper by Mr. F. H. Worsley Benison, *On the Stereoscopic Photographs of Botanical Subjects* [by the author] *in the Exhibition*, was also read, and there being no remarks elicited on the subject,

The CHAIRMAN adjourned the meeting till the 12th of December.

SOUTH LONDON PHOTOGRAPHIC SOCIETY.

The annual technical meeting of this Society was held on the 9th instant,—the Rev. F. F. Statham, M.A., F.G.S., &c., President, in the chair.

The following gentlemen were elected members of the Society:—Messrs. H. Manfield, C. G. Cutchey, J. Miller, G. A. Baker, Louis Gumprecht, F. T. Burrows, and J. D. Colton.

The private business of the Society, including the nomination of officers and council, was then proceeded with; after which

The President briefly explained the objects of these technical exhibitions, and requested any gentleman who had brought to the meeting interesting objects or useful apparatus to exhibit them. In response,

Mr. J. Werge, alluding to a design for an appliance for a copying camera he had exhibited on a former occasion, showed a further improvement he had since made. This consisted in having erected in front, and at a suitable angle, a plane with a white surface. He (Mr. Werge) also exhibited some specimens illustrating the application of French polish to photographs for the purpose of giving them an "enamel" surface. The composition of the polish, which is the subject of a patent, did not transpire, but the method of using it is to apply a little of the varnish or polish to the print with a camel's-hair pencil, and then to apply slight friction by means of an oiled rubber. Although we have since the meeting obtained a supply of the varnish or polish, our information is at present too imperfect to warrant our instituting a comparison between it and a certain description of varnish for "French-polishing" photographs which was introduced to the notice of the photographic public several years ago by Mr. Nash.

Mr. W. F. Henry exhibited a modification of the usual side-board for the camera which he had devised. It is intended for use with bellows-bodied or folding cameras. He also passed round for examination a modified double dark slide the shutters of which were constructed of ebonite.

Mr. L. Warnerke exhibited two photometers—one of them being that of M. Hermagis, and the other of M. Leon Vidal—with the principles of both of which our readers are familiar. A question having arisen respecting the preparation of suitable paper for actinometers,

Mr. E. W. Foxlee advocated the exciting of ordinary albumenised paper on a bath composed of a ten-grain solution of nitrate of silver and the same strength of citric acid.

Mr. William Brooks recommended, as being preferable, the use of a carbonate of silver paper, as recently described in The British Journal of Photography.

Attention was directed to a trinopticon, or triunial magic lantern, exhibited by Mr. T. J. Middleton. No explanation was given respecting its exceptional features. It was said, however, that in the production of certain dissolving-view "effects" it would render excellent service.

The Secretary exhibited several composition negatives by Mr. Adam Diston. Details of the method by which Mr. Diston produced these negatives were given in our issue for October 20th, page 499, and to that account we refer our readers.

Mr. Fennessy, of Limerick, made a brief communication on the probable advantages to be gained by employing "toughened," instead of plain, glass as a support for negatives, and as the material out of which to grind photographic lenses.

Mr. W. Brooks read a short paper on *Paper and Emulsion Negatives* [see page 546], and handed round for examination several charming examples of negatives and prints resulting from the working of the process described.

Mr. Foxlee exhibited a choice collection of carbon prints produced by M. Lambert's chromotype process. Special attention was directed to the fact that, although these prints were so sharp and soft, they had all been printed from reproduced negatives.

Mr. J. T. Taylor explained the peculiar features of the patent combination retouching desk of Messrs. Burrows and Colton. A descriptive article on this novel and useful appliance will be found in another page. Mr. Taylor also exhibited one of the wooden safety dippers recently introduced by Messrs. Harvey, Reynolds and Co., of Leeds, and which we described in our issue of the 3rd inst.

Mr. J. Skinner exhibited specimens of platinum printing, and Captain Fox, followed by Mr. Simpson, gave an outline of the process.

The exhibition of a *carte*, showing the effect of bronze powder upon the image, brought to a close the proceedings, the Chairman having previously proposed the thanks of the Society to those gentlemen who had brought before the meeting the various objects of interest.

GLASGOW PHOTOGRAPHIC ASSOCIATION.

The first meeting of the winter session was held on Wednesday evening, the 8th inst., at the Religious Institution Rooms, 172, Buchanan-street,—Mr. George Mason in the chair.

After the minutes of the previous meeting had been read and confirmed, the Secretary read the

ANNUAL REPORT.

We have to submit a few notes by way of report of the proceedings of our last session.

After a period of dormancy extending over eight years our Society resumed its meetings on the 18th January, 1876, and the session was brought to a close on the 10th May.

At the meeting held on the 16th February it was resolved that the ordinary members' subscription should be five shillings, and that of assistants two shillings and sixpence per annum. At that meeting Mr. J. McLean exhibited a number of Dallastype prints. Mr. Bowman showed also a large number of what were called "spirit" photographs and "spirit" paintings.

On the 1st March Mr. Urie read an interesting paper on *Carbon Printing Paper.*

On the 15th March a series of enlargements and transparencies by Mr. Croughton were exhibited; also a paper *On Lighting* by that gentleman was read.

At the meeting held on the 19th March an interesting debate on carbon printing, &c., took place, which was led off by Mr. Dodd.

On the 12th April Mr. Robertson read a short paper entitled *Items on Carbon Printing.*

On the 26th April a lantern exhibition took place in the Kibble Palace.

At the meeting held on the 10th May, Mr. Tilley's patent method of double printing was exhibited and explained by that gentleman.

It will, therefore, be seen that eight meetings have been held. Although the session was a short one the full number of meetings have taken place, the interest was well sustained and the attendance large, while the number of members elected has been very encouraging.

It is obvious that the interest in the meetings can only be kept up by having fresh and interesting material brought forward; and although friends at a distance may give us a little aid we must look to our own members to supply papers, to bring forward interesting specimens of photographic work, and subjects for discussion that will prove instructive. We have, therefore, to impress upon the members the necessity of preparing papers and bringing objects of interest before the Society's meetings, so that the latter may be made both interesting and profitable.

The Treasurer then read his report, from which it appeared that the balance from last year was £2 19s. 2d.; the income during the past session was £10 0s. 3d.—making a total of £12 19s. 5d. The expenditure was £8 2s. 0d., thus leaving a balance to the credit of the Society at the present time of £4 17s. 5d.

The reports having been passed, the election of office-bearers for the present session was then proceeded with. The following gentlemen, having been nominated at the previous meeting, were duly elected:—*President:* Mr. John Stuart.—*Vice-Presidents:* Mr. John Jex Long and Mr. George Mason.—*Council:* Messrs. Andrew Mactear, Robert Dodd, James White, John Parker, John Urie, and — Stevenson. *Secretary:* Mr. Archibald Robertson.—*Treasurer:* Mr. George Bell.—*Auditors:* Mr. Parker and Mr. Mactear.

Mr. J. Urie then read a paper on *Spirit Painting and Drawing.* In this paper he gave as his reason for coming forward a desire that the Society should be seen to repudiate all connection with spiritualism, and especially to elicit from the members an unbiassed opinion relative to the alleged spirit drawings and paintings produced through, or by, Mr. David Duguid, a photographic assistant in their city. He had no fear from spirit competition, but he dreaded the laughter that would arise at this ludicrous aspect of the art-question. He (Mr. Urie) then explained how such paintings might be produced—such as by first painting with oil colours upon the card, and when dry varnishing it over with a mixture of white lead and collodion. This would hide the painting, which would be brought out to sight by being wiped with a pad charged with ether and alcohol. A mixture of oxide of zinc and albumen would also obscure the painting, and this might be removed by licking it with the tongue even if the hands were tied. Damping the surface with nitric acid, too, would cause the opaque coating to disappear. Coating the painting with collodio-chloride of silver would cause its disappearance, a solution of cyanide of potassium serving to render it again visible. The painting might also be executed on tracing paper with oil colours mixed with Canadian balsam, and by pressure this might be set off upon the card. For producing "spirit writing" the old method of bleaching out an image by means of bichloride might be employed, the development being effected by means of ammonia or hyposulphite of soda. Sympathetic inks might also be employed; acetate of lead solution, used as ink, gave an invisible image, which was developed by sulphide of hydrogen; while pencil drawing could be imitated by writing with a glutinous ink mixed with honey or glycerine, the paper being afterwards dusted over with powdered blacklead. If a paper were written upon with a solution of ammonia, nitrate of silver, and glycerine, such writing would be invisible till exposed to the fumes of sulphate of ammonia. He (Mr. Urie) then alluded to other matters in the domain of mechanical conjuring, and concluded by deprecating mixing up "our sublime art with anything that savours of the tricks of the juggler or the devices of imposture."

At the close of the paper,

Mr. Bowman said the experiments which Mr. Urie had made did not constitute spirit-painting, which was quite a different affair, and what Mr. Urie had said and done did not apply to it in the least. Mr. Urie's paper was just following in the wake of the daily newspapers, all of them showing how little they knew about the facts of the case. Spirit-painting had been actually demonstrated as a fact, and did not now need

to be proved. He had no doubt that Mr. Duguid would give a *séance*, at which the Society would have an opportunity of seeing these strange things done—seeing them at least as nearly as could be, for he could scarcely say himself that he had ever actually seen them done. He had held a box, inside of which were a piece of blank paper and a pencil, but no chemicals for development, and yet drawings had been traced. They were assured that these things were done by spirit power, by spirits having hands sufficiently materialised to use artist's colours and produce a drawing. Of that he might almost say he knew it to be true; but it was necessary that they should not have prejudged the case in their own minds.

Mr. URIE said he might throw out a hint that there should be a meeting with the spirits on this matter—that they should give a *séance* openly to show to the Society if such things were true. He had fully and openly demonstrated before them; why should not the spirits do the same?

Mr. DODD asked whether Mr. Urie had attended any *séances*, and, if so, whether he had detected the use of chemicals.

Mr. URIE said he had never attended any *séance*.

Mr. DODD remarked that in that case he had been stating merely supposititious things about which he knew nothing.

Mr. MACTEAR described one of Mr. Duguid's *séances* which he had attended. The gas was put out and a piece of canvas, marked on the back by different parties in the room, was placed before Mr. Duguid. He commenced operations in the dark, and after going on for a certain time they lighted the gas to a small peep. Mr. Duguid was still painting. Mr. Mactear was asked to go forward and look minutely. He went over to Mr. Duguid and saw that his eyes were perfectly closed, so that it was utterly impossible he could see. There he was, painting with one colour after another, and gradually producing a picture. As to Mr. Urie's paper, he had shown some very clever tricks; but there was one thing done by Mr. Duguid which he was perfectly convinced all Mr. Urie's manipulation would fail to accomplish. Mr. Mactear went on to describe how a small card, from which a corner had previously been torn, was placed on the centre of a table, while Mr. Duguid was tied on a chair with ropes. It was quite impossible he could move, and the chair itself was tied to something else situated a long way from the table. When the gas was turned up a painting the size of a shilling was seen on the card lying on the table, and it was perfectly wet with oil paint, so that there could be no manipulation, which would simply have destroyed the whole painting.

The CHAIRMAN expressed a hope that Mr. Bowman would give a *séance* to the Society.

Mr. STUART pointed out that Mr. Urie had merely shown how certain things might be done, not how Mr. Duguid executed his paintings. He did not believe in spiritualism, but he thought this subject did not properly belong to them as photographers.

The CHAIRMAN said it was not photography, and the members would go to Mr. Bowman's, not as the Society, but as individuals anxious to investigate the question.

Mr. DUGUID said that he was the person referred to. I claim (said he) that I have a gift, and that gift from above, and I am not afraid to stand and look any man in the face, because I know the thing does happen, and not through me. Mr. Urie has poured forth sympathetic ink and all the rest of it to try and show how it is done. I am not afraid to show the cards to any man, and I never yet prepared a card in that way. Cards have come to me with the marks of the pencil upon them, and I cannot tell how these marks come there. I know what transfers are as well as Mr. Urie, and on a transfer card you never see the pencil marks. I have never once seen a card that there was anything like dry paint on; the paint is as thick as treacle, and I cannot tell you what is the cause of it. I shall be willing to give any gentleman a *séance*, but I will not come here to do it. I am not a paid medium. I never took a penny from anyone that I am aware of. I give what gift I have gratis.

Mr. MACTEAR explained that in experiments in mesmerism there must be a spirit of sympathy amongst those present. He believed there was something in spiritualism; but he did not know that that was the proper name for it. If they were all to sit round a table and any sort of feeling against the thing were to exist he did not know that it would succeed. He hoped Mr. Bowman and Mr. Duguid would be kind enough to give a *séance* in their own place, and let the members examine everything.

Mr. STUART: I have known Mr. Bowman for twenty years, and I entirely acquit him of any connivance in anything like trickery. I speak for Mr. Bowman. As for making money out of it, the thing was too ridiculous.

The CHAIRMAN said that as the matter stood those who wished might see Mr. Bowman privately. He was sure Mr. Duguid would give a *séance* in his own place.

Mr. DUGUID: Yes, and whoever comes will have every liberty to search my house, and see whether they can find any such chemicals as Mr. Urie has used.

A vote of thanks was then given to Mr. Urie for his paper, and the meeting separated.

Correspondence.

NOVEMBER MEETING OF THE PHOTOGRAPHIC SOCIETY OF FRANCE.—LECTURE BY M. JANSSEN: THE RUMFORD PRIZE AWARDED TO THAT GENTLEMAN BY THE ROYAL SOCIETY.—M. DAVANNE ON PHOTOGRAPHIC PROGRESS.—FATTY-INK PROOFS BY M. THIEL.—A PRIZE OF TWO THOUSAND FRANCS OFFERED.—A NEW ELECTRICAL LAMP.—VIOLET-COLOURED GLASS PROPOSED FOR STUDIOS.—A DIPLOMA OF HONOUR TO M. LIEBERT.—A SHADE FOR ARTIFICIAL LIGHT IN DARK ROOMS, BY PROFESSOR STEBBING.

THE first meeting of the present session of the Photographic Society of France was held on Friday evening, the 3rd inst.—M. Péligot in the chair.

After friendly greetings and the reading of correspondence, M. Janssen, the renowned astronomer, gave a very interesting lecture on the great impulse given of late to photography in astronomical observations and calculations. M. Janssen dwelt at length upon the question whether or not there were one or more planets revolving within the orbit of Mercury, as is theoretically indicated by Leverrier's calculations. Stark, it appears, as far back as 1819, observed a black mass passing across the sun's disc; it had a movement of its own, which was determined by the micrometer. Herr Weber also discovered a small spot upon the sun, in April last, which disappeared just as a planet would do in performing its orbit. M. Janssen regretted that, although the planet had been seen by many private persons, no astronomer had had the good luck to have a glance at it. He proposed that several stations should be created at different points of the earth's surface for the purpose of taking photographic views of the sun at fixed hours by means of a revolving machine similar to his photographic revolver (employed in the late transit of Venus). This instrument would take the place of an astronomer in each of the stations. The great progress, he said, made in dry plates within the last few years makes this task very easy. Dry plates could be prepared in Paris and forwarded to each station; upon their reception the person in charge of the instruments (who, by-the-bye, need neither be an astronomer nor a photographer) would put a plate into the dark slide in winding up the clockwork of the instrument in the morning and take the exposed plate out in the evening. Every week the plates could be returned to Paris to be developed. By this means, said the learned astronomer, it would be almost impossible for a planet crossing the sun's surface to escape observation. He then gave a description of his "revolver" to the members, and explained what changes would be necessary to fit it for the new service which he proposed. M. Jannsen's operator then handed round a magnificent negative of the sun—the largest that had ever been produced of that orb direct from the telescope. Its size (seventeen inches), the fineness of the film, and its freedom from dust and spots did great credit to M. Arentz, the operator of M. Janssen, who likewise received that evening from the Society a medal awarded to him for astronomical proofs exposed at the late exhibition. M. Janssen, in closing his observations, informed the Society that he had just received news that the Royal Society of London had awarded him the Rumford prize. This communication was received with great applause.

M. Davanne, in paying respect to the celebrated astronomer, said he was truly happy to see the *élan* that photography had taken in scientific observations, and that prizes were at length awarded to a *savant* who had succeeded in rendering service to science by its aid. He (M. Davanne) was the more happy as he considered a little of the honour received was reflected upon the members of the Photographic Society of France, who had been indefatigable in their exertions to point out the value of photography in the pursuit of scientific knowledge. A few years ago it was almost impossible to find a series of photographic proofs upon a scientific subject; not so at the present day. Astronomical observations made by photography are numerous, and remarkable as well for sharpness as for truthfulness, as the superb negative of the sun seen that evening bore witness. Not only the sun, but the moon, planets, fixed stars, and even the nebulæ, had come under the sway of the camera. Maps of the starry heavens could now be obtained with their glittering constellations, in which the pathway of the planets could be traced with an accuracy which the hand of the best draughtsman would be unable to design. Nor was astronomy the only science which had made giant strides with the new art; photomicrography was not behind, as the proof of Dr. Fayez, then before the meeting, would show. It would, indeed, take too long to relate all the services rendered to

science by photography. Let them hope to see in the next universal exhibition the fruits of its agency, and hear of many secrets being disclosed by its general employment among the learned.

M. Thiel then presented some very fine proofs in fatty ink, being a part of an order he received from the War Office. The proofs represented military buildings, &c. It was said that as many as 8,000 could be produced from the same pellicle.

La Société d'Encouragement offers a prize of 2,000 francs (£80) for the discovery of an easy method of converting a photographic landscape view into a printing block, with all its shades, &c., so that it can be inserted in connection with type for printing purposes. The prize will be awarded in 1880.

M. Denayrouse, a gentleman who has long occupied himself with electricity, has introduced a new electrical lamp into France, which, by its novelty and simplicity, will bring the electric light into fashion, and which, perchance, may render great service as a powerful artificial light in photography. It is well known that the mechanism of the ordinary lamp is very complicated, which proves one of the most serious obstacles to the general use of the electric light, from which cause its use is circumscribed to the purposes of scenic effects, the illumination of dockyards, &c. The construction and use of the electrical lamp is well known. The clockwork arrangement in the instrument has always been a stumbling-block in the way of maintaining a continuous and regular light. M. Jablochkoff, a Russian officer, conceived the idea of suppressing the clockwork regulator altogether. This he endeavoured to carry out, and succeeded far beyond his expectations. The lamp of M. Jablochkoff resembles a large candle (if I may be permitted to make such a comparison) with two wicks. These are made of charcoal and are kept at a certain distance apart by a non-conducting substance, such as pulverised glass, small stones, asbestos, &c. Instead of tallow the wicks are surrounded by a refractory substance, such as clay, &c. When the current is passed on the spark ignites the top of the wick, and the excessive heat generated volatilises the non-conducting substance as well as the clay; these are consumed at the same time with the wick, and give an extraordinary illuminating power to the light produced. Before the invention of M. Jablochkoff a regulator was required for each lamp, which complicated the service, as well as greatly increased the expense of the instrument. At present a single battery can feed several lamps with very little cost.

In pondering over the above invention the question has presented itself—Will not our streets ere long be illuminated by means of electricity? This question reminded me of an idea lately ventilated by a French engineer when the subject of cremation was rife. He proposed, instead of allowing the different gases to escape into the air through a very high shaft or chimney, which would probably, he said, contaminate it more than the exhalations from the cemeteries do at present, to employ such gases to illuminate Paris. A wit being present, replied that undoubtedly the idea was good, for it compelled certain persons who never during their lives did any good to society to throw light upon the world after their decease.

A specimen of violet-coloured glass was passed round for the inspection of the members; it belonged to an Italian named Scotellari, who states that when a studio is glazed with such glass portraits can be made in half the time required with white or blue glass. The "inventor" has called on all the principal photographers of Paris, with the view of selling his patent. He has a patent! It is true that the French government accepts any invention, whether good or bad. The symbols "S. G. D. G." *(sans garantie du gouvernement)* are always written on the brevet and exposed on the invention. M. Liebert received a visit from the inventor, who tried in vain to sell the former a license by endeavouring to convince him of the advantages of his system of lighting. The sitter would be more at ease; the rapidity of production would prevent distortion in the face of the model; the half-tone would be harmonious in the picture produced by the violet-tinted rays, &c., &c. Now if the numerous experiments undertaken by Mr. Gaffield, of Boston, be correct, the "invention" is a delusion. Nevertheless it is difficult to imagine that a person would come forward to certify that greater rapidity can be obtained in a studio glazed with violet-coloured glass, and go to the expense of a patent, without something of truth being connected with it; for such a person would not only be laughed at, but treated as an impostor. Mr. Gaffield's experiments—which he showed me when in Paris—were made with chloride of silver. Is it possible that the violet rays of the spectrum act differently and accelerate iodide and bromide of silver? That is the question. As for the patent, I believe it to be of no value whatever; for I cannot imagine that a photographer could be prevented from using violet instead of blue glass for his studio if found good, any more than a person could be prohibited from putting a pane of red or green glass in the door of his greenhouse. I dwell upon this invention *pour acquit de conscience*, although I am an unbeliever. M. Liebert informed me, nevertheless, that the inventor had found purchasers of his license in Russia and Italy.

In speaking of M. Liebert I have the pleasure of stating that that that gentleman has just received a *diplôme d'honneur de l'Académie Nationale* for progress made in carbon printing.

In writing on coloured glass my ideas naturally fall on artificial light for the dark room. If any of the readers of this Journal will try the following simple method (which I have employed for many years) I am certain they will have every reason to be satisfied. Take the frames of two slates and hinge them together in order to form a screen. On one side of each frame attach a pane of ground glass; on the two opposite sides place two orange-coloured panes. In this manner a space of a quarter of an inch or more between the two glasses is obtained. If the hinges be well adjusted the two slate frames can be placed at any angle so as to stand upward on a table or shelf. A sponge or any other lamp is placed behind. If the ground glass face the light it diffuses the rays; these having to pass through the orange-coloured glass lose completely their actinic power. If, on the contrary, the coloured side be presented to the light the rays penetrate through the coloured glass and then in going through the ground glass are divided. I generally prefer the light to fall upon the white ground glass, although I do not think that a great difference exists. I believe the value of this simple screen for artifical light to lie in the small space allowed to remain between the two glasses. I have replaced, long ago, the monochromatic frame of which one of the Editors kindly spoke in his last leader by the above system, and with advantage. E. STEBBING, *Prof.*

3, *Place Bréda, Paris, Nov.* 14, 1876.

MR. JOHNSTON'S NEW SILVER SALT.

To the EDITORS.

GENTLEMEN,—I have sent you a fresh supply of the silver salt as promised, and will forward the emulsion shortly. The salt was rather hurriedly prepared, and is a little moist; however, I have not found this condition to cause any difference in an emulsion made with it.

With reference to your remarks on a paragraph in my letter of the 24th October, I must say that I have trusted rather too much to the general tenor of my statements to convey my ideas concerning the addition of water to the emulsion; therefore, I will at once state that I make use of albumen, which contains water, as a vehicle to convey the latter into the emulsion. By this means the water is more equally distributed, and, at the same time, a quantity of the albumen is held in solution in the emulsion.

When I want to get a large quantity of albumen in the emulsion without the accompanying water I drive a part of the water off from the albumen by heat previous to adding it, and then shake up the emulsion with small beads or pieces of glass. By this means I got sufficient albumen in solution to support a large quantity of silver bromide. Any of the gums which are dissolved by ammonia may be added to the emulsion.

I cannot as yet give the exact quantity of water required; its use appears to be to convert the NH_3 into NH_4, and to render it more stable in the emulsion; the NH_4 also combining with the albumen gives it additional stability.

I find with the new salt I can silver glass, &c., with great certainty. This is done by driving off the excess of ammonia from the silver salt by heat, and then making an aqueous solution to which Rochelle salt is added.—I am, yours, &c., J. JOHNSTON.

38, *Cook-street, Glasgow, Nov.* 8, 1876.

[We have made, as our readers will see, some remarks upon the above subject at page 544 of the current number. The results of an extended series of experiments which we have commenced will be published when completed.—EDS.]

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.

To the EDITORS.

GENTLEMEN,—Circumstances over which I have no control have compelled me to place my resignation of the post of Honorary Secretary of the Photographic Society of Great Britain in the hands of the President and Council.—I am, yours, &c.,

30, *Richmond-crescent, Barnsbury, N.*, R. J. FRISWELL.
November 14, 1876.

EXCHANGE COLUMN.

No charge is made for inserting these announcements; but in no case do we insert any article merely *offered for sale*, that being done at a small cost in our advertising pages. This portion of our columns is devoted to exchanges only. It is imperative that the name of the person proposing the exchange be given (although not necessarily for publication, if a *nom de plume* be thought desirable), otherwise the notice will not appear.

I will exchange a Derogy's patent whole-plate triplet lens with changing lenses for half- and quarter-plate, for a rectilinear or symmetrical lens of about same focus.—Address, JOHN WEIR, 50, Canongate, Edinburgh.

For exchange, three 10 × 12 negatives—viz., 1. Melrose Abbey; 2. Dunkeld Cathedral; 3. Falls of the Tummell—for three first-rate cloud negatives of the same size.—Address, Captain G. V., The Cedars, Esher, Surrey.

A first-class, polished ash, folding tripod, circular brass top, suitable for whole-plate camera, will be exchanged for lantern transparencies of equal value; York's zoological slides preferred.—Address, W. DAKIN, Holly-bank, Netheredge, Sheffield.

ANSWERS TO CORRESPONDENTS.

PHOTOGRAPHS REGISTERED—

William Ferguson, Keswick.—*Two photographs entitled "D'ye Ken John Peel?"*

Silvester Parry, Chester.—*Eight views of "Chester Cathedral Restored," viz., The Altar Cloth; The Reredos; The Interior, from St. Oswald's; The South Aisle; Bishop's Throne; Screen and Solo Organ; Cathedral from the Wall; and Choir Interior.*

☞ *Correspondents should never write on both sides of the paper.*

NOTICE.—Each correspondent is required to enclose his name and address although not necessarily for publication. Communications may, when thought desirable, appear under a *nom de plume* as hitherto, or, by preference, under three letters of the alphabet. Such signatures as "Constant Reader," "Subscriber," &c., should be avoided. Correspondents not conforming to this rule will therefore understand the reason for the omission of their communications.

AN EXHIBITOR.—We cannot insert your letter, as it is of rather too personal a character.

LIVERPUDLIAN.—No patent is infringed by the production of such a pantascopic camera as you describe.

BETA (Paris).—Have the camera made of mahogany instead of pine; it will cost very little more, while it will be very much better.

RODERICK DHU.—The brown colour of your acetate toning bath is not caused by the chloride of gold, for the metal may be all recovered by precipitation and the colour still remain.

THE RECTOR'S SON.—Certainly; the prints may be toned *after* fixing. On removing them from the hyposulphite-of-soda solution wash thoroughly, and then transfer them to the toning solution.

THE HOWARTH STOVE.—In reply to recent queries we are enabled to say that the manufacture of this stove is now placed in the hands of Messrs. Taylor and Parsons, Cropper-lane, Bradford, Yorkshire.

HARRY SCOTT.—Unless all traces of sulphuric acid be eliminated from your developer it will not act in a satisfactory manner. Study carefully the detailed instructions given by Mr. M. Carey Lea.

F.G.S.—For the projected trip use only plates prepared by some professional dealer of recognised standing, and on your return to Europe you may then safely and profitably engage in the preparation of some for yourself.

S. P. B.—The specimens of printing received are unsatisfactory owing to overtoning. A warm, ruddy tone is preferable to a cold, slaty hue; hence let the prints be removed from the gold bath long before they assume the latter tone.

A SHILLING MAN.—In a business in which both positives and negatives are taken two kinds of collodion and developer are absolutely necessary, but only one silver bath will be required. It is also desirable that a special fixing bath be employed for use in taking positives, for whiteness of the deposited silver is of primary importance.

AN OLD READER.—It so happens that we have been recently engaged in searching through the back volumes of the Journal with special reference to the patent of Mr. Slingsby, with this result—that we have not found anything previously described quite similar to the form of studio for which he has obtained a patent. This will answer both your questions.

ASTRONOMICUS.—To prevent the formation of a ghostal image some manufacturers of telescopic object-glasses make the inner curves non-coincident, and this is probably the reason why your objective has the slips of tin foil at the margin, for without this the crown and flint might touch in the middle. We possess a very fine 3¼ inches Mertz objective in which we find this peculiarity.

AULD REEKIE.—After the expiration of six months from the date of the application you can have access to the specification upon making application at the Patent Office in Southampton Buildings, and paying a fee of one shilling. By waiting two or three months longer a printed copy of the specification can be purchased for fourpence and upwards, according to the number of illustrations.

X. L.—Allow the gelatine to soak in *cold* water for a couple of hours, taking care that sufficient water is used to cover it completely; then pour off all the water and apply gentle heat to the swollen gelatine, by which it will become completely dissolved. Before this solution has been effected the bichromate is not to be added, and it must be filtered through two thicknesses of muslin prior to its being allowed to cool.

J. THOMS.—The theoretical equivalent of pure bromide of cadmium, according to the old notation (which you say you prefer), is 136; but as the commercial salt invariably contains water of crystallisation that figure will be found practically too low. If the crystallised salt be exposed to a temperature of about 220° Fah. for three or four hours the equivalent of the resulting powder may safely be taken at 154, or Cd Br + 2 HO.

DEVONIENSIS.—You have misunderstood our meaning. We did not advise the fitting up of a stereoscopic camera with only one lens, but with *two*—not, however, that we advised the simultaneous use of both under *all* circumstances; for the whole pith of our remarks go to show that while both lenses should be used simultaneously, there was one exception to this general recommendation, viz., the production of a portrait in which it was desirable that the eyes should be represented as looking directly towards the spectator.

JUNIUS.—1. You must produce the enlargements by wet collodion, throwing an enlarged image upon the opal glass by means of the enlarging camera, the magic lantern, or a substitute for either of these instruments. The image, after being developed and fixed, must be toned by gold, special care being taken not to use mercury for this purpose; for, although it produces a pleasing tone and has been recommended by some, the picture treated by its agency will eventually fade.—2. We cannot give you any information concerning the prospects of success in Australia awaiting a photographer.

J. W. KING.—We are unable to give detailed replies to your queries; but we are informed by a practical electroplater and gilder that he invariably employs sulphuric acid to effect the precipitation of both gold and silver from the cyanide solutions when they cease to work well. He adds rather more than is necessary to effect the precipitation, as a slight excess does no harm. The latest edition of *Watt's Electrometallurgy* is said to contain information on this subject. To counteract the effect of cyanide on the hands wash, or rather immerse, them for some time in lukewarm water rendered strongly alkaline with potash. Take care not to allow acid to get near them, as it is apt to decompose the cyanide of potassium and liberate hydrocyanic (or prussic) acid.

G. HAMILTON.—There are good reasons why albumen absolutely fresh should not be employed in the preparation of printing paper. By "absolutely fresh" we mean its employment immediately after the whites of the eggs have been beaten up with the salting preparation. By allowing it to stand for a few days a physical change is caused, as a result of which stringiness disappears, and the albumen lies on the surface of the paper in such a manner as to cause it to be smooth and uniform. Although we recommend the albumen to be kept for a short time before being used, let it be understood that we very strongly object to its being kept so long that it becomes stale or putrid. We are aware, however, of the fact that paper prepared from albumen in this state finds its way into the market, and is preferred by some photographers.

RECEIVED.—A. Clarke.

☞ **Editorial Communications should be addressed to "THE EDITORS"—Advertisements and Business Letters to "THE PUBLISHER"—at the Offices, 2, York Street, Covent Garden, London, W.C.**

ANNUAL DINNER OF THE SOUTH LONDON PHOTOGRAPIC SOCIETY.—This annual social meeting was held on Saturday evening last, at Anderton's Hotel, Fleet-street, upwards of thirty gentlemen sitting down to dinner. The President, the Rev. F. F. Statham, M.A., F.G.S., occupied the chair; Mr. J. Spiller and Mr. F. York occupying the vice-chairs. The meeting was a pleasant and harmonious one, the usual toasts and responses being interspersed with songs and recitations. Among those who came from a distance were Messrs. Greaves and Sachs (both of the West Riding of Yorkshire Photographic Society), who received a hearty welcome. The proceedings terminated at a late hour.

METEOROLOGICAL REPORT,

For the Week ending November 15, 1876.

Observations taken at 406, Strand, by J. H. STEWARD, Optician.

THESE OBSERVATIONS ARE TAKEN AT 8 A.M.

Nov.	Bar.	Wind.	Wet Bulb.	Dry Bulb.	Max. Tem.	Min. Tem.	Remarks
9	29·99	E	34	36	41	34	Foggy
10	30·13	E	35	37	38	33	Foggy
11	30·09	SE	33	35	39	32	Dull
13	29·48	NW	44	45	49	33	Foggy
14	29·60	SE	48	49	62	43	Foggy
15	29·53	WNW	55	56	—	47	Raining

CONTENTS.

THE BRITISH

JOURNAL OF PHOTOGRAPHY.

No. 864. Vol. XXIII.—NOVEMBER 24, 1876.

GELATINE EMULSION AND THE NEW SALT OF SILVER.

Much diversity of opinion exists at the present time as to the relative value of collodion and gelatine as the basis of the sensitive emulsions. Collodion for many years held its own unchallenged, not only for employment in connection with the silver bath, but also in the formation of collodio-bromide and other modified forms of emulsion, until at last a rival appeared in the field in the shape of gelatine. This substance naturally recommends itself on account of its comparative inexpensiveness when weighed against the somewhat costly ingredients of collodion; and this advantage becomes the more appreciable when it is considered that, thanks to commercial enterprise, gelatine of first-class and uniform quality may be obtained without difficulty in the most obscure places throughout the length and breadth of the land. When, however, it is claimed in addition that the gelatine emulsion is not only more sensitive than the collodion preparation, but actually excels in rapidity the quickest wet plates, it is difficult to understand why collodion continues to hold its ground for any of the purposes it has hitherto served; but the explanation is to be found in the extra care and trouble involved in the preparation of gelatine plates, together with a certain want of regularity in their working, which, however, may most probably disappear as the process becomes better understood.

On the other hand, it is the great convenience of collodion which forms its chief recommendation; and this, coupled with the fact that years of research have rendered us familiar with its behaviour under nearly all the possible circumstances and conditions requisite to ensure success, will tend to retain it as the most generally-employed vehicle for the sensitive emulsion for years to come, and that in spite of the greater rapidity secured with gelatine. One great obstacle in the way of extending our experiments in connection with collodion is to be found in the unstable nature of its constituent parts, especially the pyroxyline, which prevents, or at least limits, the use of new substances which might otherwise be useful, while the comparative inferiority of its solvent powers forms another deterrent. It was in consequence of these considerations that, having failed in successfully applying Mr. Johnston's new salt to the preparation of a collodion emulsion, we were induced to resort to a trial of gelatine—not so much with a view of improving the latter form of emulsion, but in order to test the action of the new salt as compared with ordinary nitrate.

We stated last week that we had prepared a sample of gelatine emulsion, and described its appearance as being most encouraging. Since then we have had the further experience of washing the "pellicle" to remove the decomposition salts, and have developed some rather peculiar results—results, indeed, which would make it appear doubtful whether the new salt is really altogether free from action upon the gelatine, as we had imagined. In making use of the expression "altogether free from action," we must be understood to have in mind the fact that a gelatine film containing bromide of silver—that is, an ordinary gelatine emulsion film—especially after development, will resist the action of water at a higher temperature than plain gelatine without solution, though it is eventually completely soluble; yet, with this fact in mind, we repeat that it seems probable that the new salt exercises an action which does not belong to silver nitrate. We may, perhaps, best describe this effect by giving a detailed account of the behaviour of the emulsion from the commencement of its preparation. The formula employed was as follows:—

Gelatine	120	grains.
Bromide of cadmium (dried)	80	,,
New silver salt	100	,,
Water	6	ounces.

The gelatine was allowed to soak in cold water until thoroughly swelled, and was then dissolved and made up, by the addition of hot water containing the bromide in solution, to five ounces. The silver was then dissolved in the remaining ounce of water, and was added in small quantities. The first addition of, perhaps, a drachm of the silver solution produced instantaneously, in spite of the viscidity of the gelatine, a firm "curdy" deposit, totally unlike the usual precipitate of bromide of silver either in collodion or gelatine. Vigorous agitation diffused the precipitate throughout the whole body of the emulsion; but each successive addition caused a recurrence of the precipitate, which became more difficult to emulsify in each case, until, when the whole had been added, the bromide appeared to be in coarse flakes or lumps instead of in a state of fine division. After the bottle had stood for a few minutes in hot water the emulsion became perfectly homogeneous, and, after passing it through two thicknesses of muslin, gave a film which, for fineness of grain and more especially *colour*, surpassed anything of the sort we have previously met with. It was at this point we described it last week. A little of the emulsion was poured upon a glass plate (in order to test its *appearance* merely) in the evening, and next day when the film had become as dry as it would with the soluble matter it contained, it was found that, though it still retained its pristine richness of colour, an appearance of deadness, scarcely amounting to visible granularity, was apparent, which certainly did not exist before the film was dried.

The bottle containing the solidified emulsion was then immersed in a vessel of hot water to liquefy it—an operation which appeared to occupy a longer time and to require a higher temperature than usual. Poured on to glass it exhibited, when "set," the same appearance as at first, being perfectly transparent. It was then poured into a dish to the depth of about a quarter of an inch, and, when firmly set, it was divided into two portions and transferred to a couple of wide-mouthed bottles containing cold water, to remove all soluble matter. Our reason for thus dividing the emulsion was to enable us to judge whether or not the presence of free ammonia during the washing produced any effect upon the result. Accordingly, to one portion we added a few grains of citric acid; otherwise both lots received identically the same treatment. After allowing the pellicle to soak for an hour, with occasional stirring to bring every portion of the mass into contact with the water, the bottles were examined, and in each we found that a semi-transparent, flocculent substance had been formed in the washing water. This was poured off and the precipitate allowed to settle, when, upon examination, it had the appearance and feel of semi-solidified gelatine, but was perfectly free from bromide of silver. The wash-water to which

acid had been added was perfectly clear and colourless; but the other was slightly opalescent. Each, when tested with silver nitrate, showed a slight excess of soluble bromide.

After changing the waters several times, until no trace of bromide remained and test paper proved them to be neutral, the pellicle was drained upon muslin, re-transferred to separate bottles, and immersed in hot water. Here was produced the most curious result of all: though liquefaction commenced in both cases in a very short time, an immersion of *four hours* (during an hour of which one of the bottles was actually *boiled*) failed to produce perfect solution. The appearance was similar to what might be anticipated if too small a quantity of water had been retained in the pellicle, but as the bulk of one was made up to four ounces instead of three such could not be the case. We were compelled, finally, to filter out the refractory "lumps," when a very fine and even emulsion resulted, subject, however, as it afterwards proved, to the same peculiarity as before washing, namely, the "dead" appearance upon drying; though in the latter respect the acidified portion exhibited the dullness to a less extent than the other.

Presuming Mr. Johnston's preparation to be simply a combination of silver nitrate and ammonia (and we have no information or reason to suppose that it is otherwise), we must confess our utter inability to account for the decrease in the solubility of the gelatine. That the latter is not to blame will be readily believed when we say that the sample used was Nelson's, and was, indeed, portion of a packet which has on former occasions given satisfactory results with the ordinary formula. With regard to the dullness observable in the dried films, however, we may make a suggestion which will probably be considered sufficient to account for that result and, though it did not so strike us previously, for a portion at least of the granularity we had to complain of in the collodion films prepared with the compound salt. It will be observed that bromide of cadmium was used in all our experiments both with gelatine and collodion, the effect of which would be that upon the addition of the ammonio-silver salt bromide of silver is formed, while nitric acid, oxide of cadmium, and ammonia are set free. In the absence of the last named, the other two would enter into combination and remain in solution, the salt making itself visible upon drying, in the form of crystals. In the present instance, however, the nitric acid, from its superior affinity for ammonia, seizes upon that base, leaving the insoluble oxide of cadmium in suspension in the emulsion. It is not difficult to understand how in that state it might while wet remain transparent, or, at least, nearly so, but when dried *become opaque* and produce the deadness of film.

So far we are quite within the bounds of known facts; but in attempting to connect the other phenomena with the presence of oxide of cadmium we can at present only form a theory. That gelatine is capable of forming insoluble compounds with various substances is a statement which need not be repeated, and it is within the bounds of possibility that cadmium oxide is one of those. It may be urged that complete insolubility has not been noticed; but the decrease of solubility which we have described above may be the early stage of a progressive action which requires time for its completion. Portions of the pellicle we have made were rendered so far *practically* insoluble that four hours' immersion in hot water, including one hour at a temperature of 212°, failed to produce a result which under other circumstances would be arrived at in a few minutes at a much lower temperature.

We are not inclined to say that the presence of cadmium oxide in the film *per se* would produce a detrimental effect, supposing its action upon the organic and inorganic constituents of the film to be neutral. In one respect it might be found beneficial, in so far as it increases mechanically the density or opacity of the film, and thus decreases its liability to "blurring;" while after the performance of that duty it would be removed by the fixing solution. From another point of view, however, it is theoretically objectionable; but to what extent that objection would operate injuriously in practice depends greatly upon circumstances too obvious to require mention. It is evident that under the conditions specified above the cadmium oxide would be present as a *photographically* inert and useless substance in a state of extremely fine division, the effect of which after fixation of the developed image would be to leave the silver deposit "riddled" with numberless (more or less) minute transparency specks, marking the position occupied by the particles of oxide removed by the fixing solution. The amount of injury thus caused can only be estimated in connection with the immediate circumstances.

One thing is, nevertheless, quite certain, namely, that should Mr. Johnston's or any other similar salt containing or giving off free ammonia ever come into general use, it will be necessary to consider these small points carefully to enable us to judge whether cadmium-bromide should be retained or rejected. It is the particular bromide mentioned by Mr. Johnston in his first instructions, and he, doubtless, has a fit and proper reason for recommending it. It was in following his formula in the first instance, and again, in substituting gelatine for collodion, in order to retain as nearly as possible similar conditions, that we have employed the same salt; but in future experiments we shall use ammonium or other bromide whose oxide is soluble in either ether or alcohol or water, as the case may be. Potassium-bromide, though suitable for gelatine emulsion in this respect, will not be found sufficiently soluble in collodion to be of use. None of the metallic bromides will, we anticipate, be allowable; indeed, it appears difficult, except in the case of the ammonium salt, to combine the desirable properties of sufficient solubility of the salt and perfect solubility of the oxide.

Turning now to the working properties of this emulsion we have but little to record which differs from the ordinary behaviour of a gelatine emulsion prepared with silver nitrate. As we have stated, our chief object in making these experiments was to test the difference between the compound salt and simple nitrate, and not to seek any gain in rapidity; hence our remarks will refer purely to the physical properties of the developed image. The two emulsions having been freed by filtration through a double thickness of muslin from the semi-insoluble portions spoken of, three plates were coated from each, which, after being allowed to "set" in a horizontal position, were put away to dry spontaneously. We may here remark that that portion of the pellicle which was not treated with acid proved, when redissolved, to be very faintly alkaline—so slightly, however, that a piece of red litmus paper floated on it for five minutes showed but the faintest sign of change of colour.

The plates being dry they were exposed in pairs under a tolerably dense negative to the gas flame, each pair receiving a progressively increasing exposure in order to test the effect of under- or over-exposure upon the colour of the deposit. Upon developing the first plate prepared with the alkaline emulsion the image came out slowly and apparently without vigour; a three-grain solution of pyro. was used, with a slight trace of bromide of potassium, the ammonia carbonate being used at first very sparingly. As it seemed impossible to get up the density in that manner a fresh developer was made containing a full quantity of ammonia well restrained with bromide, and after considerable trouble we succeeded in obtaining what appeared to be *barely* printing density. When the plate had been fixed, however, it was found to be really very much denser than we had thought, a transparent veil over the whole surface having helped to give a deceptive idea of feebleness. In colour the deposit was of a brownish black of a very non-actinic description.

The fellow plate prepared from the emulsion which had received acid treatment was then subjected to exactly the same development as the first. Little, if any, difference in the rapidity of the development was to be detected, but the appearance of the image as it came out formed a marked contrast. Both shadows and detail developed vigorously, standing out bold and clear by reflected light, and resembling greatly a positive on opal. Upon adding fresh ammonia the intensification proceeded with rapidity, and without producing the slightest fog or deposit on the high lights. When fixed the image was bright and vigorous, and of a splendid olive or smoke-brown colour, very different from the first, and highly non-actinic, as we proved by exposing the transparency with a piece of sensitive paper. The development of the remaining plates requires no further description; the only difference was a slightly quicker development, the behaviour of the respective plates in each pair and the colour of the images being in each case exactly the same as in the first.

Our deductions from these experiments are that the action of the double salt during sensitising produces some effect which alters the the colour of the subsequent deposit, for the images we have obtained are in that respect quite unlike any we have ever previously obtained with gelatine; also that the presence or removal of the free ammonia produces a further difference, which affects not only the colour of the image, but principally its clearness and vigour. In none of the six plates we have developed can we notice any objectionable appearance arising from the presence of the cadmic oxide in the film during development, the dried image, especially in the finer details, being free from any trace of the "deadness" complained of in the unexposed films. How they will bear examination under the microscope we are unable to say.

COPYRIGHT AND COPYISTS.

A few days ago, when conversing with a Parisian friend who had been visiting the English provinces, we were informed that a widespread feeling of dissatisfaction exists among photographers, in at least one portion of England, relative to the facilities afforded to the public by a certain class of tradesmen in London, who for a small sum—say half-a-crown per dozen—undertake to reproduce and supply good copies of any *carte* sent to them for that purpose. The special grievance to the photographer appears to consist in this—that, in many instances, after he has exerted himself to the utmost of his ability in posing and lighting his sitter—in some cases having, perhaps, to provide special backgrounds and the best optical appliances, and in return for which expenditure of skill and means he is reasonably supposed to make such charge as will recompense him—the sitters, after receiving the specimen portraits sent home for approval, content themselves with paying the few shillings which is charged for the *first* copy, declining to order any more. This proof is then sent off to the London copyist, who at a small charge will supply copies by the dozen, to the loss of the photographer whose skill and appliances were brought into requisition in the production of the original picture. We are invited to offer an opinion upon these proceedings, and to say whether or not the law of copyright can be brought to bear so as to stop such nefarious proceedings.

It certainly is a great hardship that the photographer who, it may be, has just expended ten guineas on the purchase of a lens, and half as much more for a background, with which to take a portrait of (say) the Earl of Beaconsfield at the instance of a local stationer, should find the latter person—the employer as respects this particular order—turning round, after a successful print has been submitted for approval, and saying "I see that your regular charge for *one* copy is so and so; I shall content myself with only one, for which I now tender the specified amount." Let us analyse this transaction from the twofold point of view—business and copyright. As regards morality, that does not enter into the question at all here.

If a photographer choose to inform the public that he will be happy to take portraits, *carte* size, at three shillings for one copy or at seven shillings and sixpence per dozen, and if a customer prefer the former alternative where is the grievance? The same rule applies to Lady Vere de Vere, Lord Derby, or John Tompkins. The employer—an enterprising stationer of the county town—knows that the photographer is a man of taste and genius, fertile in every artistic appliance, and he gives him a commission on his own printed terms. He obtains one good portrait and immediately despatches it to the half-crown-per-dozen copyist. In this case, as we have put it, there is no breach of either social or business morality. The photographer obtained his fee according to his advertised terms, and there the matter terminates so far as he is concerned. Having delivered the first proof and closed the transaction, his next step should be to put himself in competition with the London copyist, for which conflict he occupies the highest possible vantage ground, inasmuch as, first, he is already in possession of the negative; and, secondly, this negative being the original one will of necessity yield proofs immensely superior to those prints obtained from a negative taken from a paper print. Both in price and quality he is, therefore, in the best possible position for driving his antagonists out of the field.

Before touching on the copyright phase of the subject we may allude to the purely business part of the matter. It is unwise for photographers to undertake work at too low a rate for single copies; for the wisest arrangement is to divide their charges in such a manner that, even if only a single copy be accepted, they will be properly remunerated for their trouble. It is open, of course, to a photographer to refuse to supply a less number than a dozen; and it is also open to him to supply a print for approval which shall have his name punctured or written across it, so as to prevent the possibility of its being either put into "circulation" or used for copying purposes.

With regard to the application of the law of copyright to such a case as that to which we have directed attention there need be no difficulty. The Act which was passed in July, 1863, stipulates that "the person making or executing the same shall not retain the copyright thereof, unless it be expressly reserved to him by agreement in writing signed at or before the time of such sale or disposition by the vendee or assignee of such painting or drawing or of such negative of a photograph, or by the person for or on whose behalf the same shall be made or executed; but the copyright shall belong to the vendee or consignee of such painting or drawing or of such negative of photograph, or to the person for or in whose behalf the same shall have been made or executed." This, we apprehend, is language the plainness of which should leave no doubt as to its precise meaning. All copyright in a photograph is vested in the person on whose behalf or by whose request it was executed, the photographer having no right in the matter at all unless an agreement to that effect be made "in writing." We supplement what we have here stated with an extract which will demonstrate to the photographer the danger he encounters in printing from any negative in his possession, and distributing copies of the same under the mistaken idea that he can do what he likes with negatives that he himself has taken:—

"If the author of any painting, drawing, or photograph in which there shall be subsisting copyright after having sold or disposed of such copyright, or if any other person not being the proprietor for the time being of such copyright, shall, without the consent of such proprietor, repeat, copy, colourably imitate, or otherwise multiply for sale, hire, exhibition, or distribution, or cause or procure to be repeated, copied, colourably imitated, or otherwise multiplied for sale, hire, exhibition, or distribution any such work or the design thereof, * * for such offence shall forfeit to the proprietor of the copyright a sum not exceeding ten pounds, and all such repetitions, copies, and imitations, made without such consent as aforesaid, and all negatives of photographs made for the purpose of obtaining such copies, shall be forfeited to the proprietor of the copyright."

From the foregoing it must be inferred that the possession of the negative confers no advantage whatever with respect to copyright. In point of law, therefore, it is perfectly legal for any proprietor of a *carte*, or other portrait, to send it to any London copyist for reproduction. The only way by which the photographer can protect himself is to make a stipulation with his client, at the time of sitting, by which the copyright becomes vested in the photographer—which stipulation might, however, be overruled by the Court of Chancery—or write his name on every proof issued in such a manner as to prevent the picture from being copied without at the same time copying his signature. If he has had a special background prepared he may, of course, register the design of that background, and in this way be placed in a position to proceed against those by whom, or to whose order, the portrait may have been copied.

CRYSTALLOGRAPHY AND THE LANTERN.

The three instruments which, whether used separately or in combination, are capable of yielding, probably, the greatest amount of intellectual enjoyment—with which no educated man should be unacquainted, and which no one who can afford them should be without—are the camera, the lantern, and the microscope. There is no season of the year and no hour of the day in which one or other, or, indeed, all together, may not be made to minister to the intellectual pleasure and educational pursuits of those who possess

and know how to use them, and in the use of no other instruments is it possible to more deeply interest, educate, and amuse a circle of friends, whether at the fireside or in a public assembly.

Thanks to the camera the lantern has long ceased to be a mere toy fit only to amuse children, although even in that humble sphere it did good work in its early days; but, in consequence of the thousands of pictures from nearly every part of the known, and many parts of the almost unknown, world that can be bought for a mere nominal sum, the general public may readily become nearly as well acquainted with the ruined temples of Egypt, India, or Central America as with Cheapside or Charing-cross. Aided by the microscope the lantern is gradually finding its way into the lecture-room as one of the very best exponents of physiology and natural history, and the time is not far distant—if it has not already arrived—when it will be considered absolutely essential for the proper illustration of most branches of natural science.

Great as are the benefits which have resulted from a union of the camera and the lantern we believe that, from an educational point of view at least, they will be much greater from the union of the lantern and the microscope; and, with a view to stimulate those who have opportunity for that kind of work, we are anxious to direct attention to a phase of it which, although capable of producing most beautiful effects, has been too much neglected; we allude to the production of lantern pictures, if we may so call them, from microscopic crystals both by plain and polarised light.

We are aware that, so far back as 1853, Dr. Strethel Wright, of Edinburgh, who has only recently been removed by death, made some beautiful copies of such crystals on daguerreotype plates, and that in 1864 he publicly exhibited a series which had been taken on wet collodion, and coloured to show the effects of polarised light. In 1874 M. Jules Girard gave to the French Academy of Sciences an account of some experiments he had made in the same direction; but, so far as we are aware, these experiments have not resulted in any practical application. This is the more surprising as the operation is simple enough, and crystallography is a subject of much interest, while its exhibition with polarised light is probably one of the most beautiful things in nature. We have, unfortunately, not yet attained to the knowledge of how to prepare a film that will give the colours of crystals as seen by polarised light, and possibly never may; but we know from experience that it is less difficult to lay on such washes of transparent colour as shall prove wonderfully accurate representations of them than it is to paint a good lantern picture.

With a view to the approaching "lantern season" we were looking out our apparatus some weeks since, and, remembering that a series of simple pictures are apt to be monotonous, were anxious to secure something that could be easily introduced by way of variety. Crystallography occurred to us, and we at once set about the necessary experiments, and with such success that we think the following account of them may prove useful.

The first requisite is, of course, the production of suitable crystals, and this is an operation requiring considerable care. The ordinary way for microscopic examination, as is well known, is to lay a drop of a solution of the salt to be crystallised on a slip of glass, warm it over a lamp, and then allow it to cool; or to watch the process of crystallisation as it cools. In consequence of the want of depth of focus of the microscopic lens only one plane can be brought into focus, and therefore the crystals must be both as transparent and as thin as possible. We have succeeded well by using somewhat weak solutions, and placing the slips of glass under a bell jar along with a capsule containing sulphuric acid. Several slips of each salt should be laid down, as they vary much in suitableness, and the best can then be selected. The operation should in no case be hurried, as some of our best specimens took fully twenty-four hours to crystallise. As a rule the crystals should be photographed as soon as possible after they are made, as most of them change very rapidly—some by deliquescing, and some by efflorescing—while the evaporation of the "mother liquor" leaves others in an opaque, powdery state. We need not particularise the salts that are most suitable—each experimentalist will find pleasant amusement and useful information in ascertaining that for himself; but we may say that chloride of sodium, ferrocyanide of potassium, nitrate of sodium, nitrate of potassium, sulphate of iron, and sulphate of copper will afford examples of all the six systems included in crystallography, while sulphate of quinine, salicine, and hydrochlorate of morphia give objects of extreme beauty.

The microscope is arranged as for ordinary microphotography—that is, placed horizontally, and the eyepiece and tube removed and inserted light-tight into the lens mount in an ordinary quarter-plate camera, the lenses, of course, being removed. In some microscopes it is not possible to remove the tube, as the object-glasses are screwed into its lower end. In such a case the eyepiece may either be removed and special precautions taken to prevent reflection from the sides of the tube, or it may with advantage be left in its place. Here we may state that, in photographing crystals for the magic lantern, a microscope and microscopic objectives are not really necessary; for, as we have shown in a previous article and as the late Mr. John Bockett demonstrated at a meeting of the now defunct North London Photographic Association, a photographic lens of short focus answers this purpose most admirably, possessing also the advantage of having its visual and chemical foci coincident, which is not the case with microscopic objectives. Various methods of illumination were tried, including the use of the ordinary mirror with sunlight and the oxhydrogen light; for low powers, however, an argand paraffine lamp answers quite well, when used with the condenser. For simple lantern pictures extremely beautiful effects are produced by polarising the light, the analyser being turned so as to show the crystals on a dark ground. This necessitates a much longer exposure, but with a dry-plate that is of little consequence. The only difficulty likely to be experienced is in focussing, as the fine adjustment requires to be turned to correct the difference between the chemical and visual focus; but with a few trials the amount of turning may be marked, and then the adjustment can be made accurately. The plates we find most certain and successful are the ordinary emulsion with slight excess of bromide—a sufficient excess, in point of fact, to give with a strong alkaline developer a bright, clear, dense image. Of course the exposure is in all cases long, and varies much with certain salts; in some instances we have given with an argand lamp as long as fifteen minutes before a suitable impression could be made.

Very fine effects, also, but of a different kind, may be obtained by condensing the rays from the lamp on the crystals, and thus using reflected, instead of transmitted, light. In this case the back of the glass slip should be covered with a piece of moist, red blotting-paper, which prevents a certain blurring of the image that we attributed to reflection through the glass. The backs of the sensitive plates must also in all cases be covered with an opaque backing.

We have, of course, merely given a slight outline of how a very beautiful and useful series of lantern pictures may be produced by anyone having a microscope at his disposal; and, while such experiments would afford pleasant amusement during the winter evenings to the amateur, doubtless the professional maker of slides would find the crystallographic pictures a profitable addition to his stock.

Though we have every respect for the opinions and judgment of our esteemed contributor, Canon Beechey, we must take exception to the theory he propounds in his communication to the Manchester Photographic Society (see page 561), in which he attributes a certain phenomenon in some of his negatives to the action of electricity. The phenomena in question occurs upon a fogged plate and takes the form of a circle corresponding with the position of the disc of the plate-holder, and which is perfectly clear and free from fog—an effect which he supposes to be due to the force of electricity developed by the friction caused by revolving the plate upon the rubber disc of the holder. It has long since been proved that electricity does exercise a powerful action upon sensitive films; but we believe that action is in the direction of reduction rather than the opposite, as Canon Beechey would have us believe. But, even allowing the possibility of such an effect arising from the cause alleged, we think it is open to a very

considerable amount of doubt whether the quantity of electricity developed by so slight an amount of friction as would ensue under the circumstances detailed would be powerful enough to penetrate so bad a conducting medium as a sheet of glass. The following experiment (which has been repeated for the fourth or fifth time as we write) will illustrate our meaning:—We have before us a piece of glass of the usual thickness for quarter plates, a piece of "bottle" india-rubber with a freshly-cut edge, and a tuft of cotton wool pulled out as fine as possible. We pass the cut edge of the india rubber sharply and with a slight pressure across one side of the glass plate, and present the *opposite* side to the tuft of cotton; it may be pressed against it without attracting a single filament. Reverse the glass—that is, present the side over which the rubber has passed—and *at a distance of half-an-inch* distinct signs of attraction are shown. It is only after several passes of the india-rubber are made in rapid succession that any electrical power is exhibited by the reverse side of the glass. The amount of friction applied by a single stroke of the india-rubber is at least as great as would arise from a half revolution of a glass plate upon its holder, yet the experiment shows that no electrical force reaches the opposite surface of the glass. Again: even supposing the film side of the glass to be rendered electrical, how comes it that the effect is localised, so as to form only a circle of action? Many explanations have been offered of this and similar phenomena, and in one instance which came under our personal notice the cause was distinctly traced as follows:—The operator, who worked with a paraffine lamp having a varnished chimney, performed the operation of intensifying with the light *below* the level of the plate, in order the better to watch the progress of the image. A succession of plates exhibited, as in Canon Beechey's case, a clear circular patch corresponding with the position of the pneumatic holder, the remainder of the film being veiled or fogged. After casting about in all directions for the cause it was at last discovered that the varnished lamp glass permitted sufficient light to pass to fog the plate, and falling as it did upon the back of the film that portion protected by the holder escaped the evil. The defect disappeared with the removal of the cause. The circumstances in Canon Beechey's case favour the belief that this may prove to be the correct solution of his difficulty. Working, as we understand him, away from home, and in an extemporised laboratory, the light which was sufficiently non-actinic to cause no inconvenience with a full exposure was powerful enough to produce fog under the prolonged development of an under-exposed plate.

GELATINE EMULSION.

I THINK the following experience with a gelatine emulsion may be of interest to some of your readers, as showing the influence of silver nitrate on the mechanical and chemical behaviour of such emulsions.

An emulsion was made of the following ingredients:—

Bromide of ammonium	10	grains.
Gelatine	20	„
Nitrate of silver	17	„

In this formula the bromide is in excess. The emulsion—one ounce—was, after washing, made up to two ounces by the addition of warm methylated spirit, it being required for a special purpose.

Plates prepared with this emulsion proved rather insensitive, and it is worthy of note that the emulsion remained liquid even at a low temperature, the silver bromide being very finely divided.

After about three weeks nitrate of silver was added in the proportion of about ·7 grain to the whole of the bromide of silver. The small crystal of nitrate of silver was put into the bottle and shaken up with the emulsion, the immediate effect being that the bromide of silver seemed to combine into minnte clots. After being laid aside for one hour the clots seemed—I say "seemed" because I cannot trust myself to explain what really did occur—to have agglomerated into a gelatinous mass,, as if the gelatine, water, and bromide of silver had separated from the spirit. The gelatinous mass had taken the form of the bottom of the bottle, but was prevented from adhering, I presume, by the spirit.

After vigorous shaking the emulsion had the same appearance as before standing. Then after standing in a warm place for about half-an-hour the bromide settled to the bottom of the bottle, but I regret that I did not look to see whether two strata of liquid were apparent. On shaking the emulsion had a purer appearance than on shaking before warming, but the bromide soon fell to the bottom. Allowed to cool, the bromide, and apparently the gelatine too, or at least part of it, settled in a small space * at the bottom of the bottle; and on turning the bottom of the bottle upwards a gelatinous cone hung down, but, on shaking, disappeared. The bromide refused to leave the bottom of the bottle even with much shaking. The bottle was warmed again, when it appeared as before cooling. Then a slight excess of bromide of ammonium was added, which immediately re-emulsified the contents. This was four hours after adding the nitrate of silver in excess. I now find the emulsion is in very good order and gives a very fine film, the sensitiveness of which is considerably greater than before the treatment with nitrate of silver.

But what is the cause of the effects I have tried to explain? I do not look upon the fact of the bromide of silver being precipitated in a coarser form as anything very remarkable, for this is sometimes the case under somewhat analogous circumstances. What I look upon as peculiar is the action of the gelatine in concert with the bromide. The gelatine did not appear to be acted upon immediately, or, if it was, it must have been in fine division; and perhaps this latter view of the case is the correct one, as the "gelatinous mass" I have mentioned broke up into a state of division like that the emulsion first assumed on the addition of the silver.

It also appears from the facts of the case that the cohesion between the particles was not very great. On heat being applied, and the bottle being shaken, the precipitate was finer, having parted with the gelatine; but this proves that the effect was not a mere precipitation of the gelatine with bromide entangled in it. The bromide was also acted on by the excess of silver; and I have not much doubt that the effect was due to the presence of a large quantity of alcohol. However this may be, the fact remains that the addition of bromide of ammonium cured this state of things as quickly as they had been caused by the silver.

It appears that gelatine will not remain so well in solution in a mixture of water and methylated alcohol when nitrate of silver is present. This has set me thinking whether such a fact might not be put to practical use, and it seems possible that it might. Suppose we have a decomposed emulsion, good enough chemically, but which it is impossible to develope: an equal part of methylated spirits is added to the emulsion, both being mixed while warm; then an excess of nitrate of silver is added, and the whole kept warm, while the bromide precipitates itself to the bottom of the bottle. The supernatant liquid is now decanted and the bromide washed by repeated changes of water, and to the comparatively pure bromide fresh gelatine is then added. But it is possible that when the excess of nitrate is washed away the bromide would become finely divided and unmanageable; if not, after a good washing a soluble bromide might be added. HERBERT B. BERKELEY.

LICHTDRUCK.†

As a supplement to the processes already described I shall give a process as modified by me, and a description of a drying-box of my own construction, both of which recommend themselves by their simplicity.

I use but little of the water-glass film, because it only keeps for a day or two. A very thin film is quite sufficient to produce the necessary combination of the second film with the glass; I therefore dip a broad, soft brush in this water-glass film, and draw it with slow and equal strokes, so as to avoid air-bubbles, across the previously-ground glass, and leave the latter to dry. In this way the white of one egg is sufficient to prepare a large number of plates.

I do not wash the plate with water again before the subsequent treatment. A zinc vessel is placed upon a table, and in it a tripod, with wooden adjusting-screws, is placed and arranged in a horizontal position by means of the screws and a water-level. The gelatine to be used for the production of the second film should not be very sulphurous, nor, indeed, contain much acid, as such gelatine is friable and apt to be peeled off the plate during the printing; neither should gelatine be used which dissolves partially in cold water, as it furnishes a film which easily misprints.

A good gelatine being chosen, it will be sufficient if the former purifying process be but partially employed as follows:—Soak 140 or 150 grammes of gelatine in 1,200 grammes of water. This water should be often changed at intervals of a few hours, a little water being poured off and measured and the same quantity added. When this treatment has been continued long enough the gelatine should be dissolved by a gentle heat, and a beaten-up egg added and well

* On first settling, as above stated, the gelatinous mass occupied more than half of the contents of the bottle.

† Continued from page 450

mixed by beating; it should then be placed on a strong fire and brought as quickly as possible to the boil, stirring steadily all the time to prevent the gelatine from adhering to the bottom of the vessel. When the boiling-point has been reached it is allowed to cool a little and is then filtered through flannel, when the formerly grey fluid will be found to have become clear and transparent.

To filter gelatine an apparatus is used which allows of its being kept warm during the whole operation. It consists of a tin, funnel-shaped vessel, between the outer side and lining of which hot water is poured by an opening at the top. A filter funnel fits into this, being enclosed by the warm inner lining of the vessel, while the tube of the filter passes down through it. This apparatus is placed upon a tripod high enough to allow of the filtered fluid being collected in vessels placed below. The following solution—

20 grammes of bichromate of potassium,
10 " " of ammonium,
in 360 " of water,

is then mixed with the filtered gelatine, which is now ready for using at the second preparation. A sufficient quantity of this mass is poured upon a perfectly horizontal plate, and spread with a strip of blotting-paper, and, should it show an inclination to flow back from the edges of the plate, it should be rubbed over them with the fingers; then, letting any superfluity run over into the vessel, to be used again later, place the plate in the drying-box. In order always to work under the same conditions, and to avoid irregularities on the surface, it is necessary, especially in winter, to maintain an equal temperature—say 18° R. in the workroom—and to keep the bichromated gelatine mass while in use at about 35° R., as it stiffens readily, and when in that state it is impossible to pour it on equally.

In order to keep the gelatine warm a rather high pot is used, into which an iron bottom is set, which serves as a stand for the vessel containing the bichromated gelatine. The under part of the pot is filled with water until it almost touches the vessel. Above the water level an angular thermometer is placed, by means of which the temperature of the interior can be ascertained from the outside. The pot is covered over, placed upon a petroleum or spirit lamp or a gas flame, and the water heated until the thermometer indicates the thirty-fifth or fortieth degree.

The upper portion of the filtered mass of chromated gelatine is often full, to a depth of several centimètres, of small air-bubbles, which might cause inequalities in the film. On that account a tin vessel, having a tap at the bottom (like a coffee machine) may be used with advantage to keep the mass warm. This makes it possible always to draw off clear gelatine for the preparation of the plates.

A sufficient quantity of the filtered gelatine is poured upon the centre of the plate levelled upon the tripod. It is then spread equally with a strip of paper or a glass triangle and dried in the drying-box at a temperature of 40° R. The drying-box, constructed according to my plan, is in the preparing-room, while the firing is effected from the adjoining room. Here water is heated in a small cistern and conducted by pipes to a flat tin box standing in the drying-box. From thence another pipe leads back to a small reservoir, and from that again to the heating apparatus, so that the hot water is constantly in circulation, and the temperature, which is equal, can be regulated as desired. The box is also furnished with sliding panels on all four sides, so that one can regulate the plates lying upon the levelled bars from all sides with convenience.

My drying-box has the advantage over others of avoiding dust and smoke, and of rendering it impossible that the heat in the box should be too strong. Besides that, when the water has been made hot enough, and the prepared plates laid in the box, the fire only requires to be kept up for a short time, because the water being enclosed retains its heat for a very long time—so much so that after the lapse of some hours it will only have fallen from 45° to 25°, and by that time the plates are always dry and may be exposed under a negative.

As the chromated gelatine film changes with age the plates should not be prepared above two or three days before use.

The printing-frames are similar in construction to those ordinarily used in photography, only the prepared plate is pressed into contact with the negative by wedges, because the pressure of springs would not be strong enough; the enclosure and back are also absent. In order to shut out the light from the back the frames are furnished with a sliding panel, or are laid in a shallow box. The frames may be examined in a half light, and with a little practice one soon knows when to stop printing, as the yellow bichromated gelatine film becomes first a light brown, and after a longer exposure of a dark brown colour. The plates are then placed in a grooved tin box amongst cold water in order that the precipitated chromium salts may be removed by solution. The water must often be changed, and the plates should only be taken out and left to dry spontaneously when they have completely lost their yellow colour.

In preparing negatives for lichtdruck the greatest care should be taken to get them as perfect as possible, because without negatives free from blemishes no good lichtdrucks can be produced; and it would be good discipline for many photographers if they had to prepare negatives for lichtdruck for a time. The negatives should be taken upon plate-glass plates large enough to allow of the picture being taken upon a film of iodide of silver of uniform thickness—a thing that is not always possible upon small plates, because the collodion film is generally thin at the upper side and thick at the lower—that side where the collodion was poured off.

In order to get perfectly clean and clear negatives the silver bath must often be filtered, to prevent the spots caused by dust or particles of collodion from forming, and the chemicals must be skilfully blended.

Negatives taken in the ordinary way would furnish reversed pictures by lichtdruck, so that to get proper positives reversed negatives must either be taken or they must be made from intermediate plates.

Inanimate objects can most easily be taken with a Steinheil's aplanatic lens, in front of which a prism is screwed for the purpose of reversing the image. It requires, however, a little care and practice to work with the prism, as, should the lens and prism not be properly placed, the resulting lines will be distorted. Should there be no prism at hand, or should some animated object (which could not undergo the long exposure required by the prism) have to be taken, the plate may be exposed reversed—that is, with the collodion side behind—the springs of the dark slide being adjusted so as only to hold the plate by the corners, and allowance being made for the thickness of the glass when focussing. It is better, however, to take the negative in the ordinary manner and, after it is fixed and dried, to draw it off the glass. This can be done in various ways.

To draw off the negative by means of gelatine a preparation is made by dissolving one part of gelatine in four or five parts of water, and to 150 grammes of the mixture three or four grammes of glycerine is added, and the whole filtered through flannel. The warm gelatine solution is then poured upon the centre of a negative, previously warmed and levelled upon a tripod, and spread with a strip of paper or a glass rod equally over the negative without injuring it. The gelatine is then left until it stiffens, after which the plates are allowed to dry spontaneously, which they do at a temperature of 15° R. in from six to eight hours. When dry the gelatine side is varnished with common negative varnish, after which one has only to run a knife round the gelatine film a few lines from the edge of the plate, when the negative may be removed with ease.

The drawing off of the negative with paper is simpler and quicker than the foregoing process. Choose for this purpose some fine, smooth post-paper or tissue-paper, paste it over with a thin arrowroot paste filtered through flannel, and lay it, avoiding air-bubbles, upon the dry negative; place a sheet of blotting-paper over it and smooth it out well either with the palm of the hand or with a brush, and let it dry. Now cut through the paper down to the glass close to the edge of the plate, lay the plate in water for a few minutes, lift it out, and, by raising the corners with a knife, the negative may now, along with the paper, be drawn off the glass. When dry the paper must be made transparent with Canada balsam or dammar varnish. The negative can also be drawn off in this way, gelatine being used instead of paste. T. H. Voigt.
—*Monatsblätter.*

(To be continued.)

BEECHEY PLATES AND THEIR WORKING.

[A communication to the Manchester Photographic Society.]

Seeing you have no subject on your notice paper for next Thursday's meeting I have thought you might like a line from your old President on his work at the lakes during the October holidays. It is seven years since I was there before, and I felt like a schoolboy going home when I drove from Keswick to Seatoller, in the heart of Borrowdale, with my wife and servant and a good batch of the Beechey dry plates.

About the latter I was not a little anxious; for, acting upon my own advice to make fresh plates just before starting, I took down my stock-bottle of bromide solution, quickly converted some into emulsion, and the next night prepared two dozen plates (all my drying-box will hold). I lighted my little spirit lamp under it and was going to bed, but fortunately remembered some writing I had

to do, for in about an hour I perceived a strong smell of burning. I opened my *atelier* door, was greeted by a cloud of smoke, and found my drying-box on fire. The spirit lamp had been too near the sheet-iron bottom; the alcohol had got hot and evaporated, and set fire to the box. I succeeded in putting it out before much damage had been done; but how about my plates? They were too hot to hold! Were they spoiled? I had neither time nor weather for trial; but I made a second batch all right in case. I took developing material with me, and on the first fine day tried a picture. Expecting the sensitiveness of the plates to have been injured I gave three times my usual exposure, and to my delight I got an excellent negative. Indeed, all my plates have proved extremely good, beautifully clear, and exactly like wet plates.

And now a word about the speciality of these plates. They are absolutely certain. Only give them exposure enough if you have plenty of time, and, however dark the day, you get a good picture. I greatly prefer over-exposing, because by a weaker developer the picture comes out gradually, and ever fuller and fuller without forcing—plentifully dense without redeveloping—perfectly clear without a trace of fog—and, when fixed, they have the bloom and beauty of wet plates.

If, however, you give under-exposure you can force out the picture in a marvellous manner; but you ultimately lose the wet-plate quality, and get a black film with, in extreme cases, fog, but still a good printing negative.

But now I am going to tell you of a circumstance but for which I am not sure I should have written this paper; for it relates to a phenomenon which I have never seen treated on before, and tends to show I think, beyond doubt, that the action of light upon the bromide film, if not altogether electric, is greatly modified by electricity. In developing my plates I use an india-rubber holder with a wooden handle. On two occasions, when trying to force out plates exposed upon a dark ravine and waterfall on a gloomy day, I put the holder on the back of the plate the wrong way for my hand. Instead of loosing it and putting it on again right, *I screwed it round* whilst tightly holding to the glass. Well, at first the picture came out slowly, and I knew it was under-exposed. I forced it with repeated doses of ammonia and I saw it fog at last, on which I stopped and cleared it, and got my picture; but lo! in the centre it was perfectly clear and bright whilst all round the centre it was fogged equally, leaving a circle the exact size of the holder on which no deposit of fog had fallen! I fear my drawing will scarcely show the picture. It is meant for a rocky and wooded mountain torrent, with large stones in front and near the fall; but I think you will understand the effect by noting the light circle with the waterfall in it. I have turned the negative into a positive, or you would never make out what I mean. Now, as this effect took place in both the plates on which I screwed the holder round, and on none others, I feel sure the friction of the india-rubber on the glass gave an electric surface to the centre piece, of different tension to the outer parts of the plate, and so caused less deposit on that part than on the rest of the plate. Explain the effect to me in any other manner if you can.

I am very sorry to add that we had only two fine days during my three weeks' holidays, and so I only exposed the over-baked two dozen plates, but I got nice pictures of Coomb Waterfall and Old Mill, of our old friend the Bowder Stone, and some bridges and rocks, &c., which are pretty and good. But I really cannot speak too highly of the plates, which are nicer and more certain and equal than any I ever worked with.

I am pleased to see a good report of these plates in connection with the Liverpool Amateur Photographic Association's meeting, and heartily wish some of my Manchester friends would try their hands on the chloro-bromide emulsion, made according to my exact formula. St. Vincent Beechey.

SOME RAMBLING THOUGHTS ON LIGHTING.

It is not my purpose to lay down any fixed rules for lighting the sitter, for I think there are none that will be applicable, since every light differs materially from every other, and each subject requires some modification of light. Also the manner of treatment of the sitter differs under the same light by reason of the variety of ways different artists will treat the same subject, giving a *personality* to the picture peculiarly his own; but there are some points having a common bearing that might be well to observe. In a general sense the lighting ought to be the same as it is desired to appear in the picture; but the shortcomings of chemical action make certain modifications necessary owing to the photometry of colours, as, for instance, some light shades of hair photograph too dark, and an allowance of light, after a judicious use of powder, may be necessary to give the proper chemical balance. The same may be said in regard to draperies (except the powder). For white or very light draperies the light should be so subdued that the shadow lines may be retained in development; a shadow so strongly lighted as to come up stronger than the high lights of the face will be sure to flatten and spoil the picture. The direction of light should be such as to give well-defined lines of light and shadow—say top light at an angle of about forty-five degrees, and side light at a somewhat lower angle, so as to break up abruptness, but not so as to destroy solidity. Direction of light should be not only apparent but well defined in every picture. Never let the light flow directly over the camera to the sitter. Suppose the downward flow of light to be at an angle of forty-five degrees, it should cross the line from the camera at a considerable angle, say twenty to seventy degrees.

Except for full-length figures the lower half of the side light should be very sparingly used, or, in other words, the side light and top light should join so as to produce one solid light, one general direction of light; and to soften the shadow side a folding screen of about eighteen-inch panels or sections, painted in some light neutral tint, will be found very useful. Avoid too broad high lights; in fact they should be used sparingly, middle tints freely, and every high light should be balanced by a corresponding shadow, with the understanding that the shadows admit much greater breadth than the lights, and intervening middle tones should so melt into both lights and shadows as to destroy all abruptness of either, and produce a harmonious whole. A broad light and a broad, solid shadow are alike distasteful, and also a blank space in the picture; the high lights should be round, and shadows *transparent*. Should you experience trouble in getting a sharp, clear focus be sure there is some offensive "cross" light that needs cutting off; for a well-lighted subject will give a clear, sharp image on the screen—one that can be readily and quickly focussed. A head-screen will be found to be frequently serviceable.

It is not necessary to sacrifice any good quality of a picture in order to secure another—as sharpness to secure softness. Such things are only tricks, contemptible in their meanness.

The external lines can only be spoiled by bad posing and bungling management of the background; but in the internal lines all the modulation should be preserved in the lighting and faithfully brought out in the negative. The reputation of the artist and pocket of the proprietor demand that as little "modelling" be left to the retoucher as possible. Except for very small children let the question of time of exposure be of minor moment; that of *effect* the supreme object to be attained. Always determine just how you want the finished picture to look before you begin, and work faithfully to that end, and the result will be equal to your powers of conception, or, at least, only curtailed by the faults of chemical action and optical imperfections. Let your light so shine that the camera, seeing your good works, shall let others know the mind of the master. F. M. Spencer.
—*Philadelphia Photographer.*

THE ALLEGED DIFFICULTIES OF THE CARBON PROCESS.

I have repeatedly observed that photographers who have learnt the carbon process in my studio, and have become adepts at it, are not successful in other studios. A closer inspection showed the cause was that the accommodation provided for the carbon process was quite unsuitable. One would attempt to dry tissue in rooms where the damp ran down the walls, or where there was never the slightest change of atmosphere. Further: one would read the photometer by an unsuitable lamp; and, lastly, there would not be a sufficient number of dishes provided, so that the steeping before the application of the squeegee, the developing, the rinsing, and the toning must all take place in the same bath. Then, again, impurities are not avoided, and that is the worst of all, since the carbon process depends above all upon cleanliness. Then I remark that the printer continually forgets that the carbon tissue is much more sensitive than silver paper, and that the room in which he works must therefore be considerably darker than is required by the worker with silver paper.

I know of large establishments in which I have sought in vain for a suitable place for carbon work. The tissue would be dried in a room through which every one passed, and where, with the people, light and dust also entered; while the printing-frames were filled-in in the silver-printing room, where it was much too light. It was the same with the developing. The result was naturally not satisfactory.

That in the height of summer the difficulties are considerably greater is evident when at an ordinary temperature the gelatine had

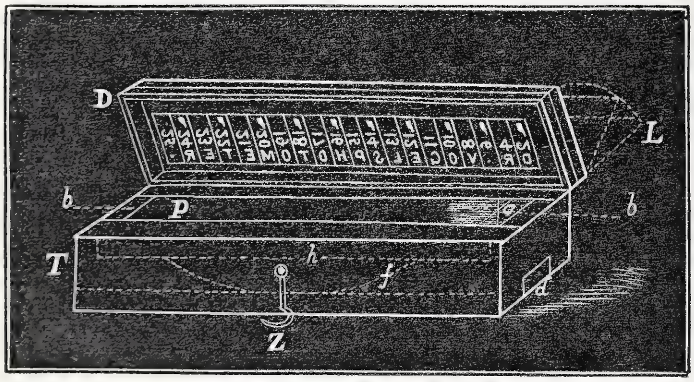
already commenced to run off the paper; but even then these difficulties may be greatly reduced if one has a cool cellar at his disposal.

Photographers must bear in mind that they have to do here with a very beautiful process, but one that is entirely different, and that requires the observance of quite another set of precautionary measures, from the silver process. He who tries to print in carbon without a proper place to work in, or a suitable equipment of apparatus, will very seldom succeed; hence the failure of many photographers who have tried the process superficially—*en amateur*, so to speak, rather than as workers in earnest.

He who wishes to take up the carbon process should first prepare some photometer tissue, and exercise himself in the use of the photometer. Then he may sensitise a few cabinet-sized pieces of tissue, and print them under a negative of medium density until the number 15 of the photometer or the drawing beside it begins to be visible. He may then practise the single transfer process upon paper. The first picture will almost always be destroyed by the squeegee; afterwards he may print some copies two degrees deeper, and try the single transfer upon glass. When he has mastered that he may proceed to the double transfer upon paper; and at last he may reach fine transparencies for enlargements, and the reproduction of negatives.

It has sometimes been maintained that the numbers on a Vogel's photometer are difficult to read off on account of their paleness, and that one may in this way make a mistake of one or even two degrees. This is, however, an error. If one follow exactly the directions for use the reading off of the degrees of the photometric scale is easy and sure. I have often in my studio placed a photometer after exposure in the hands of four or more persons, all of whom have unanimously read off the same number as the printed degree. A practice of two hours is sufficient to enable one to use the photometer with perfect certainty *provided all is done according to rule.* Usually, however, the following mistakes are made:—

1. The strips of bichromated paper are cut too long and too wide, so that they are jammed into the little box T, so that the pressure of the springs is insufficient; the consequence is that the numbers do not print sharply. Such unsharp numbers are, indeed, difficult to recognise.



2. The slip of wood H, which serves to press the paper, is put in wrong side uppermost. It should be placed with the notched side uppermost, so as to press the paper up from the box. The more firmly the strips of paper are pressed against the scale the sharper the numbers will be, and therefore the more easily will they be read.

3. The sensitive paper is frequently exposed to the clear light of day, by which means it is affected and rendered less sensitive.

4. To ascertain the number a bad lamp without a shade is frequently employed, and that is very reprehensible indeed. When it is desired to examine a delicate impression of light, such as the numbers on the photometric scale, one should always protect the eyes from harsh light.

There only remains to be said that the letters and hands on either side of the numbers are placed there intentionally, as they aid in distinguishing the impression made by the light, so that one does not depend altogether upon the numbers, but partly on the appearance of the figures printed alongside. If, for example, the outline of the hand beside 14 appear, the light has reached the fourteenth degree of the photometer, even should that number not be visible.

—*Mittheilungen.* H. Vogel, Ph.D.

MILWAUKEE CORRESPONDENCE.*

Suum Cuique! Preparation and Rectification of Emulsions.—A Simple Test to Prove Excess of Silver in Emulsions.

The high considerations which the details of my process, as described in the number of your valuable journal for September, 1875, received, more especially by Dr. Vogel, who highly recommends in his journal what he calls the Singer process, emboldens me to offer you this new contribution in the emulsion way. Since the origin of the emulsion process the main effort of the various processes was to have the silver and bromide in the emulsion evenly balanced, or to have only a trace of soluble bromide left. Lately two plans for this purpose attracted the principal attention of emulsion workers. First, the pellicle process, which attains this end through an expensive and laborious process, and which, at least in my hands, never equals the undoctored emulsion as far as sensitiveness or intensity is concerned. Besides these, it requires any amount of doctoring, commencing with the cotton, and after the emulsion has gone through the hydropathic treatment it is drugged again *ad infinitum.* In the second plan, which is becoming popularised by our eminent Mr. Newton, the emulsion is prepared with an excess of silver, which is turned into a chloride by the addition of a chloride salt. A controversy has lately sprung up between Mr. M. Carey Lea and Mr. Newton about the priority of the use of a chloride in the emulsion as a means to prevent fog. There is no doubt that Mr. Lea first found that the chloride possessed this virtue, and used the chloride of copper in connection with his emulsions, all containing great excess of silver, as a restrainer; but somehow he discarded it again, and introduced his *aqua regia.* But principally I find that Mr. Lea's highest aim was to find some substance restraining enough so as to enable him to work with an emulsion containing a large excess of nitrate of silver. For this purpose he adopted the chloride of copper, and later the *aqua regia.* I quote from The British Journal Photographic Almanac for 1872, from the contribution of the eminent Mr. H. Cooper:—

"I am glad that Colonel Stuart Wortley has discarded the use of *aqua regia* and substituted a simple chloride. The introduction of a chloride into a simply-bromised collodion, and also with a bromo-iodised collodion, has been a subject of interest to me since the spring of 1869. Nine months before Mr. Carey Lea published his mode of using a chloride in his collodio-bromide process, I had found it of great benefit in a modification of Mr. Gordon's process using a chloro-bromised collodion. I have also used it with collodio-bromide emulsion, but only in the endeavour to gain increased sensitiveness. *Mr. Lea is undoubtedly entitled to the credit of having first pointed out its value in preventing fog when excess of nitrate of silver was used.* I am convinced that the introduction of *aqua regia* in the collodion was a grand mistake. All the benefit to be derived from it may be obtained by using a simple chloride," &c., &c.

In the same place, and also a year previous, we find, by Mr. Henry Cooper's plain and simple directions, how to prepare an emulsion by letting it ripen with excess of silver for a few hours, and then adding enough bromised collodion to have a trace of soluble bromide left.

We see from the above quotation that Mr. Lea used a chloride in his emulsion as a restrainer for the excess of silver introduced, as his greatest aim seemed to be to prepare an emulsion capable of containing the largest excess of silver.

To Mr. Newton certainly belongs the merit of having brought the use of a chloride to a perfect system. First, of using the chloride to take up the excess of silver, and so in a simple way produce a sensitive permanent emulsion containing neither free *bromide* nor *silver;* secondly, by showing that plates prepared with an emulsion of such a nature need no extra washing; thirdly, by finding that the simple addition of a chloride would restore foggy emulsions.

What is the cause of this rejuvenating power of the chloride? Probably the addition of a chloride introduces a molecular change by liberating bromine or hydrobromic acid, which latter works in a similar way. But the remedy is a specific cure for the disease, and all credit should be given to the discoverer.

This (Mr. Newton's method) is, no doubt, superior to any other for preparing an emulsion, and in connection with the alcoholic preservative as introduced by me is simplicity itself.

But it occurred to me some time before Mr. Newton introduced his chloride that we could be able to eliminate this excess of silver by introducing into the emulsion insoluble salts, which, having a strong affinity for the silver, would eliminate it, and thus produce by a simple operation an emulsion containing bromide of silver and nothing else. I have tried several substances with great success.

My Methods Detailed.

First Plan.—The first substance I tried for this purpose was cyanide of potassium. To use it proceed as follows:—To a given quantity of bromised collodion made by any of the numerous existing formulæ (but if any acid be given in the formulæ it should be omitted) add enough of an alcoholic solution of pure nitrate of silver, until it is indicated by my silver test that all the bromides are converted and a silver excess shown.

My Silver Test

Is simply a solution of bichromate of potash in water. The use of it is as follows:—Drop a little of the emulsion on a glass plate; let it congeal a little, then pour some of the bichromate solution on it. An excess of silver is immediately indicated by a deep blood-red stain, while if there be only a little trace the stain will be deep orange; and if the emulsion do not contain any the solution will be repelled from the greasy film, or by moving it up and down only stain it a pale lemon-

* From the *Philadelphia Photographer.*

yellow. Moreover, the stain of the excess of silver, being insoluble chrome-silver, cannot be washed off; the other can. The alcoholic solution of silver should be added until by the blood-red stain of the test an excess of silver is manifested and no more. Now drop into the emulsion a dry lump of cyanide of potassium. Without shaking set the emulsion aside. The cyanide will dispose of the silver in a very short time, and the emulsion will be cleared, according to the temperature, in from six to twenty-four hours. The emulsion should be tried with the test from time to time; if no silver be indicated by my test a trial plate should be taken, and if the pictures be too thin or foggy they should be left in contact with the cyanide some time longer, until a clear, vigorous image is obtained. The emulsion should be then decanted from the cyanide. The cyanide will eradicate any fog. Almost any kind of pyroxyline will be ripened by the cyanide and give good results. The only drawback is its energetic caustic action on the ether and cotton. I only had a chance to use the commercial cyanide, which contains a surplus of carbonate; but I think the use of the pure crystallised would not offer this objection, or the emulsion might be left in contact with the cyanide only a few hours, and then finished by the second method.

SECOND METHOD.

The second method is still more simple and gives excellent results, and will work well alone or in conjunction with the first method. To the emulsion, prepared as in the first method, is added a quantity—an excess does no harm—of perfectly dry (anhydrous) chloride of sodium in coarse grains; leave quiet at the bottom of the vial, and set aside. The chloride of sodium will dispose of the silver in about twelve hours or more, and the emulsion will be at the same time ripened to the creamy state. If a trial plate be not satisfactory leave it longer in contact with the salt, or shake it up with it. The whole process of conversion of the silver can be done in a few minutes by shaking vigorously; but I advise to let those substances work quietly through the length of time at the bottom of the vial, because, first, by the slow action of the silver the necessary molecular change in the emulsion is produced; secondly, the product of decomposition of the cyanide, chloride, &c., remains at the bottom, and will little, if any at all, contaminate the emulsion.

THIRD METHOD.

This is similar to the second; it consists in the use of a carbonate. Its use is similar to the chloride of sodium described in the second method. Pure carbonate of lime in excess is added in coarse grains to the emulsion, and proceeded with exactly as in the first and second methods. Probably other carbonates could be used, also other chlorides, and other salts insoluble in alcohol and ether and having an affinity for silver. I think the chloride of sodium will, on account of its simplicity and the peculiar generic action of the chloride for producing clear pictures, become immensely popular, while many will succeed with the cyanide who cannot obtain suitable cotton.

Emulsions prepared in this way will hardly contain anything else but pure bromo-silver. They will be very sensitive and work clear; but if wanted as further security a trace of a bromide or, after Mr. Newton's plan, a chloride can be added to them. They can be used without any preservative, more especially if to the bromised collodion a little nitro-glucose be added before sensitising; *but at anyrate I recommend the application of my alcoholic organifier, which will be an improvement under all circumstances.* With a peculiar alcoholic preservative I have had plates by this emulsion which in five seconds' exposure showed a fully detailed, clear picture *before development*, with a rather dense sky, and only needed a little alkali to give the sufficient density.

After having given *suum cuique*, I think I can, without being immodest, claim as my own—

1. The introduction of an alcoholic preservative.
2. The rectification of the emulsion by the introduction of salts insoluble in alcohol and ether but having an affinity for silver.
3. The indication of a simple test to prove the presence of nitrate of silver in an emulsion.

SIGMUND SINGER.

Our Editorial Table.

PICTURES BY ROBERT FAULKNER.

WE are much pleased to find that Mr. Faulkner has consented to publish in an enlarged form two of those charming portraits of children which proved so attractive in the last two photographic exhibitions. We have received enlargements of the two pictures, *Little Dorothy* and *Simplicity*, the latter of which, we need scarcely observe, is quite familiar to our readers in consequence of its having formed the pictorial illustration in our last ALMANAC. The proportion of the oval in relation to the picture is somewhat wider than that selected for the ALMANAC, while it is at the same time a little longer, thus showing more of the figure—the dimensions altogether being about eleven inches by nine inches. The two pictures are printed in permanent pigments of a deep sepia tint. There are many photographers who will gladly avail themselves of the publication of these exquisite pictures in the enlarged form to secure them for their collection of art gems.

THE AQUARIUM: ITS INHABITANTS, STRUCTURE, AND MANAGEMENT. By J. E. TAYLOR, Ph.D., F.L.S., &c.
London: HARDWICKE AND BOGUE.

WHEN we state that in this work, which contains over three hundred pages, there are no fewer than two hundred and thirty-nine illustrations, some of them of full page dimensions, an adequate idea may be formed of the pictorial value of the book, more especially when we add that we can strongly attest the thorough accuracy of these illustrations.

On the subject of aquaria generally we do not require to enter, as it is one which is not strictly in place in a journal devoted to light—its laws and its chemistry—rather than to water and its inhabitants. Still, this work possesses much that is of great interest to the cultivated photographer. It is not long since we were in the reception-room of a photographer conducting a successful business, who had there as the chief source of attraction—an "attraction," he slyly hinted, which *attracted* many new customers—an elegantly-constructed and well-stocked table aquarium. It cost a large sum to erect, but the expenditure involved in its construction and stocking it with its piscine inhabitants has already been returned to a fourfold extent. To the requirements of professional or amateur photographers, whose tastes or interest may prompt them to extend their attractions in this direction, the several chapters of Dr. Taylor's admirable work will be found specially adapted, and this whether the aqueous element placed at command be salt or fresh, a becoming distinction being made between the two. A design for a very attractive "octagon table tank," and one which would admirably answer for a photographic reception-room—or, for that matter, for a drawing-room where taste and refinement predominate—is given at page 140 of the volume, and to which we direct attention. The construction of this form of tank does not involve much expense.

Of a chapter devoted to the "Aquarium as a Nursery for the Microscope" we cannot speak in terms sufficiently high. It is a portion of the book which appeals directly to the photomicrographer; for it discourses most eloquently upon the small things of creation, and presents a great variety of objects which are more or less familiar to the photographer who devotes his attention to this class of subjects. Some of the *Pinnularia*, *Pleurosigma* and *Navicula*, and other objects equally well known to the microscopist, are here delineated with admirable accuracy. If photographers could only be made to realise what a store of pleasure demands attention in objects like these there would be no more complaints of the lack of interesting employment during long winter evenings. A temptation is here offered to enlarge on the interesting subject of microphotography, to which, prompted by a perusal of Dr. Taylor's most suggestive book, we might append a dissertation upon "tank" photography; but space forbids our doing so at present. We close by expressing our high approval of the work which has elicited these few observations.

Meetings of Societies.

MANCHESTER PHOTOGRAPHIC SOCIETY.

THE ordinary monthly meeting of this Society was held at the Memorial Hall, on Thursday evening, the 9th inst.,—Mr. Alfred Brothers, F.R.A.S., President, in the chair.

The minutes of the previous meeting were read and passed.

The PRESIDENT then said:—On taking the chair this evening as your President my first duty is to thank you for the honourable position you have placed me in. It is no part of my business to inquire why you have elected me. I accept the office, and shall endeavour to fulfil its duties to the best of my ability, believing it to be the duty of every member to work for the interest of the Society. I cannot, however, overlook the fact that some of our members—gentlemen who have worked at photography from the time of its discovery, and who have been members since the formation of the Society, twenty-one years since—are equally, if not more, eligible than myself. If the office of President is one to be held for an indefinite number of years I cannot help saying that in Mr. Mabley we had a President who was entitled to our confidence and respect, and I can only conclude, from his not having been re-elected, that the majority of the members are of opinion that the office should be subject to change. The other members of the council render themselves ineligible for re-election for non-attendance,

and I see no reason why the President should be an exception. I have, therefore, to suggest that our rule for the election of President should be modified. I think that no member should hold that office for more than two years consecutively, and that he should be out of office at least one year before he is again eligible. By this means other members of the council would be compelled to take their turn in office. When I say that the President should not hold office for more than two years consecutively, I do not mean that his election should be for two years. I see no reason why the change should not be made annually, if thought desirable. I do not wish to touch on any subject likely to lead to controversy; but there is a matter in which this Society is deeply interested which, I feel, must be alluded to. The interest of these meetings will be seriously interfered with if the members cannot feel safe in exhibiting new apparatus or in bringing up new matter for discussion. I allude, of course, to the patent recently taken out by Mr. Young. There can be no doubt that the entire apparatus is a copy of one used by Mr. Noton in these rooms on many occasions, and that the parts claimed as new are of very little importance when compared with the whole. It will, I am sure, be admitted that when anything new is shown here it is as much the private property of the exhibitor as if he had kept the object in his own secret possession. If, however, it be the wish of the exhibitor that his object should be described publicly in the photographic journals, such publication should be considered as prohibiting the right of any other person to patent any part of the work. Unless there can be some guarantee that the rule of our Society shall be something like what I have suggested, there can be no doubt that the interest of our meetings will decline. It must be considered satisfactory when our meetings have an average attendance of twenty-eight members. Our Society is entirely technical, and the meetings can only be made interesting by each member feeling that it is his duty to bring everything new or interesting here for exhibition or discussion. But it does not follow that only new matter must be brought forward; an interesting discussion may often be introduced on an old subject. It may have been worn almost threadbare, but a new turn may be given and some valuable information elicited. We should not lose sight of the point that the members must have confidence in each other, and no cause for ill-feeling must arise as in the case I have alluded to. "What is there new in photography?" This is a question frequently asked, and is one very difficult to reply to. There is much that is new; but is novelty always desirable? The photographic journals teem with new notions and processes; but how many of them are of any value, or come into general use? A careful inquiry into this matter would lead to useful results, but would require more time than I can spare at present. There is one process we are all interested in, which is of universal importance; the oldest, and the one to which the universality of the art is due—the art of printing on paper. There is now a rivalry between this art and the newer one of printing in carbon. Prints by the latter process may be considered permanent, and some may be found who will contend that results equally beautiful with the silver print may be produced in carbon; but, unless they are enamelled, I doubt whether any carbon will compare favourably with a perfect silver print. The perfection of photography may be seen in a silver print, and great permanence may be secured provided the proper care be taken in its production. There can now be no doubt that the permanence of silver prints depends very much on their being properly toned with gold, and afterwards, of course, sufficiently washed. It has been the practice for some years to send out prints of a warm tone, and there can be no doubt that this is often more agreeable than the colder purple. But what is the result? It must have been observed, when looking through prints that have been done a few months, that the once beautiful, warm-toned print has become a sickly yellow, while the fully-toned print retains its original colour, and will probably be found to be permanent if carefully protected. And this reminds me to say that too much is often expected from photographs. Why should not a photograph be as well cared for as a water-colour drawing? Let any drawing of this class be treated as photographs frequently are and it will be found that the photograph will in many cases bear the rougher usage. The fact is that photographs are cheap, and are too often valued accordingly. One thing appears to be assured: photography is appreciated by the public. Its applications are innumerable, and are daily becoming more and more valuable. For portraiture, next to silver printing, there is no process giving such wonderful results as the Woodburytype; but the prints have the disadvantage that they require mounting. Next in order stands the photo-tint, which for book illustration (portraits) appears at present to be unrivalled. For general work the various autotype processes are extremely valuable. Photolithography must not be forgotten, as by its aid perhaps more book illustrations are produced than by any other method. There are other important improvements which might be referred to, such as the production of blocks for printing with type. The few examples on the table will show that great strides are being made in all mechanical printing processes. Can it be said with truth that retouching (as it is called) has been a benefit to photography? So far as it has enabled photographers to produce pretty pictures I grant it has been a benefit; but that photography, as an art, has been benefited I question. The removal of defects is perfectly legitmate—anything beyond that is not so. It is possible to make a man of sixty look only forty-five—it is possible, also, to make a bad negative produce tolerable prints; but does not this lead to a slovenly system of work? It is unsafe to prophesy; but I cannot help thinking that a few years hence it will be found that the over-wrought work of the present day has had its disadvantages. Questions of identity will arise, and show the pernicious system of over-worked negatives—the retouching and modifying now so universally adopted—will be found to have been a mistake. We are working in the wrong direction; our aim should be to make the negative perfect as it leaves our hands, and to make ourselves independent of the retoucher. I do not suppose for a moment that what I say will have any influence; but I have already seen the disadvantage of the system when enlargements have to be made from small prints from retouched negatives. Artists find great difficulty in restoring likeness in such cases. Truth is sacrificed to prettiness, which, I think, is much to be regretted. The collodio-albumen process has in the hands of so many of our members produced results so near perfection that it may be a waste of time to suggest the trial of any other processes. We have heard a great deal about emulsions and pellicles, but we have seen here very few results from the use of either. May I suggest that if any members have anything to show by the methods named we should be glad to know their experience. It would be tedious to refer to a variety of other matters which suggest themselves for notice; they will probably crop up during the session, and I shall not fail, to the extent of my ability, to call your attention to anything of importance.

The SECRETARY then read a paper by the Rev. Canon Beechey, M.A., Vice-President, entitled *Beechey Plates and Their Working* [see page 558], which was followed by a short discussion.

The President showed some choice specimens of photo-mechanical printing, which were much admired.

Mr. Coote showed a negative, and a transparency from it, in which some distant hills were distinctly visible through the two masts of a vessel in the foreground, but not through any other part. This peculiarity was not satisfactorily explained.

Mr. D. Young exhibited his oxygen apparatus, to convince anyone interested that it was really an improvement on Mr. Noton's.

The PRESIDENT admitted that the apparatus shown by Mr. Young was an improvement upon the one shown by that gentleman at a former meeting, and also upon the original machine designed and made by Mr. Noton.

A vote of thanks was passed to the Rev. Canon Beechey, M.A., Vice-President, for his timely and interesting communication, and the meeting was adjourned.

BERLIN PHOTOGRAPHIC SOCIETY.

THE usual ordinary meeting of this Society was held on the 6th. ult,—Dr. Vogel occupying the chair.

The proceedings commenced by the President laying on the table a copy of a new work by Dr. Stein, the title of which is *Light as Applied to the Service of Scientific Research by Means of Photography.*

Then, in compliance with a request made at a previous meeting, two of Busch's new aplanatic lenses were brought for trial. They are intended to be used for landscape work and for copying. Their actinic power is greater than the triplet, and their field larger. Herren Rückwart and Vogel undertook to try the lenses, to compare the results obtained, and to report upon the same. Meantime it was mentioned that Herr A. Moll, of Vienna, had already tested one of these aplanatics and was very well satisfied with it.

A letter from Herr Mischewsky, of Dantzig, was then read, in which he said that he had long tried to get rich folds with a thin silk curtain, but always without success until he lined it with haircloth gauze, when he was so delighted and astonished at the beauty of the result that he could not refrain from imparting the idea to his professional brethren.

Herr HARTMANN remarked that he also considered lined silk the most suitable material for the purpose, and mentioned that a heavy, silky stuff lined with a stiff lining, and much more suitable for studio curtains than woollen stuff, had been obtainable for a long time back at Herren Löescher and Petsch's.

The President then laid on the table four photographic views of the interior of the Photographic Hall at Philadelphia, and gave some particulars as to the plan on which the awards were made, and as to the number of German exhibitors and prize-takers.

Herr Von Schlicht, of Potsdam, presented the Society with an extensive collection of landscapes taken upon dry plates.

Herr Schaarwächter presented a report upon the late exhibition at Utrecht and also of a visit to the Autotype Company's establishment at Ealing Dene, where he was especially struck with the large plates used. He saw one five feet in length prepared. It required two men to coat it with collodion—one to pour and the other to move the plate about—and in spite of the great surface he found the collodion dried pretty equally, and that in the subsequent manipulations technical faults were rare. The large plate was silvered in a flat wooden bath coated with asphalte, one end of which was covered. A pair of pivots placed near the centre of the bath allowed of its being canted up until it was almost upright, the covered end where the silver was collected being lowermost. The plate was then laid in, and a catch in the bottom of the

bath being so arranged as to hinder the plate from shifting, the bath was covered over and canted back until the silver flowed over the plate. In the carbon department he saw a four-horse-power engine which ground the pigment for the tissue, &c. The tissue was prepared in large rolls, and it was noteworthy that the numerous flaws in the tissue occasioned by the heat of the past summer, of which there had been such frequent complaints of late, were almost unknown at this establishment. This immunity Herr Schaarwächter attributed to the tissue being sensitised and used shortly after it was made. In the establishment he found about a hundred persons employed, many of them being females.

Herr Talbot showed a small female portrait, which, being the first specimen of the work produced by M. Leon Vidal's new process the members of the Society had ever seen, attracted great attention, but was pronounced, as a work of art, to rank no higher than an ordinary brightly-coloured photograph. He (Herr Talbot) then showed several pictures by Klary, of Algiers, exemplifying his own system of lighting without the use of curtains.

The President remarked that there were many studios in America in which there were no curtains, the light being directed, as desired, by movable screens, and by a skilful choice of the sitter's standpoint.

Herr Talbot then showed a number of carbon prints, at the same time regretting that, in spite of its beauty and other advantages, the carbon process was not taken up as it might be. In the discussion which followed,

Herr Schaarwächter said a principal reason was that it was not so easy to produce a good carbon print as a good silver print, the lights being apt to be too marked in carbon prints.

Herr Prümm agreed with Herr Schaarwächter, and thought it a great pity that in the carbon process one had to work with paper not prepared by oneself. He should like to know how far the faults in the tissue observed in the late hot weather were attributable to that circumstance, and he expressed himself as inclined to think much more perfect work would be produced if one were able to prepare one's own tissue.

Dr. Vogel said Mr. Sawyer denied that.

Herr Prümm gave an account of a visit to the exhibition of art and industry, at Munich, and of a visit which he paid to England in the summer. When in London Herr Prümm visited none of the photographic studios; but, judging by the display in the windows and show-cases, he thought the London photographers were behind his own townsmen of Berlin; and that the work produced by some of the provincial photographers was quite as good as, if not better than, that of their metropolitan brethren. Besides the Autotype Company's works the only place of photographic interest he seems to have visited in London or the neighbourhood was the Woodburytype establishment, where he was astonished to see that the printing plates obtained by impression from the gelatine relief were pure lead, and not composition, as he had hitherto believed.

At the conclusion of Herr Prümm's remarks the meeting was adjourned.

Correspondence.

SOUTH LONDON TECHNICAL MEETING: THE WHY AND THE WHEREFORE.

To the Editors.

Gentlemen,—I am sincerely sorry that the Technical Exhibition of the South London Photographic Society proved such a failure. There was a time, but—"no matter." I fancy when I ransack my cells of memory that there is a notice issued by the Committee to intending exhibitors to this effect—that no person is allowed to exhibit anything that is patented or for trade purposes, or something tantamount to that in effect.

Now this particular idea of itself is the one thing to shut out from the Technical Exhibition most of its likely contributors, and only amateurs and non-business persons are open to send in the products of their busy brain. This way of doing business is, in my opinion, decidedly wrong, because the generality of mankind are selfish enough to expect to be paid for loss of time and often money in perfecting something in some particular branch of business and profession in which they think their endeavours will be appreciated. Secondly: I do not see why the photographic profession should have every output of a man's fertile invention in that particular line given to them for nothing.

I remember on one occasion, when the gelatino-bromide process was introduced by Mr. Burgess—who, I have no doubt, had studied days, weeks, and I may say months, to bring it to something like perfection—directly he commenced to explain the particular idea some one in heavy tones asked if it were a secret process, and, upon the unhappy inventor lisping out the little word "yes," mysterious cross glances were immediately given from one side to the other, and it was then explained as blandly as possible that it was against the particular instructions issued, so could not be allowed. You may say—"If he knew the instructions why did he come?" Perhaps he did not, so thought anything new would be acceptable to a liberal-minded community; for, mark me, he did not insist you should believe in the new process or that even you should buy it. He was merely showing a meeting of a certain number of persons interested in a certain business a new thing; if they liked it they might have some, if not they might let it alone. I am happy to say that though not listened to at the meeting he had the perseverance enough to go on. The sequel is that the pellicle, in the hands of another, has become so popular that orders can only be taken in *rotation*, and must be given some time in advance.

I may say I am not a dry-plate worker; I am partial to gravy, although I don't stand sauce from any one my own size. The next exhibition will be a success if done as they do the invitations to religious worship now—"all seats free; come and welcome." Issue an advertisement in both journals to the effect that statements from anyone having anything new in relation to photography will be gladly accepted by the committee of management of the South London Technical Meeting—the pioneers of an *united* association of photographers. You'll have plenty of suggestions and many useful things too; but, if not, it will be like a tramway line near me, where there is such a number of forms for the passengers to go through—the money must be paid, and the ticket punched directly on payment and in front of, &c. "Notice, the company will not be responsible on and after." You are thus bewildered. The best thing is, if they intend to go on, and the South London Photographic Society intend to uphold these stringent rules, let something like the following notice be given:—"Notice: Any person found trespassing on this tram car [or in the case of the technical exhibition—'on these premises'] will be prosecuted."—I am, yours, &c.

November 20, 1876. James Syrus Tulley.

[It is evident that Mr. Tulley labours under a misapprehension with regard to restrictions being placed upon such articles as might have been exhibited at the technical meeting referred to; for in the circulars issued in connection with that meeting there is an announcement that "secret processes or patented articles with name of inventors and their objects" would be introduced by the Secretary or by a member of the Committee, and that explanations would be allowed, but only absolutely in reference to the practical uses of the articles shown. Questions might also be asked so as to gain a clearer understanding of the subject. We remember vividly the occasion to which Mr. Tulley has alluded; and we recollect, also, that in consequence of what was said and done at the time there was a strong outcry against allowing any person in future to make use of these meetings for the purposes of advertising and "strongly recommending" certain things respecting which no technical information whatever was furnished.—Eds.]

The Rifle and the Camera.—The following extract from the *London Gazette* may interest some of our readers, though taken from a column we do not usually quote:—"War Office, November 14, 1876.—2nd Middlesex Rifle Volunteers—Lieutenant J. A. Spencer to be captain." Mr. Spencer's is not the only name well known to photographers to be found on the roll of volunteer officers. Mr. J. Spiller, Vice-President, and Mr. H. Baden Pritchard, late Hon. Sec., of the Photographic Society, also our able contributor, Mr. J. B. C. Fox, and others, are captains in that branch of the reserved forces.

Photography Underground.—We have been favoured by Mr. F. Brown, of Walsall, with an excellent stereograph taken by that gentleman in the depths of a coal mine in the vicinity of Walsall. The illumination was effected by the lime light in addition to that obtained by the combustion of magnesium. We understand that one of the greatest difficulties encountered was the drying of the plate during the long exposure found necessary; but this affords only another example of the great utility arising from the employment of rapid dry plates, which, while necessitating no longer exposure than wet collodion, would bear an indefinite prolongation of exposure without becoming in the slightest degree deteriorated. The picture received from Mr. Brown is one of the most successful of the kind we have yet seen.

A New Patent Tinter.—We have received from Mr. George Nesbitt, of Bournemouth, a very ingenious little piece of apparatus which, at first sight, we imagined to be a *carte* printing-frame. On closer inspection we found it to be in reality a "tinter;" that is, an apparatus for tinting the borders of photographs in either a plain or an ornamental manner, and printing at the same time the name and address of the artist. The masks accompanying the "tinter" are of the most varied shapes and dimensions, and we are glad to see that they register with such accuracy as to be capable of being used in carbon as well as in silver printing. Upon subjecting this "tinter" to the crucial test of practical trial we were surprised to find with what ease "effects" similar to those hitherto considered peculiar to Lambert's process of "chromotypie" could be obtained when using ordinary *carte* negatives. Mr. Nesbitt has secured his invention by patent, and in the course of time we shall publish the specification; but further information of a business character may, in the meantime, be ascertained from an announcement in our advertising columns.

EXCHANGE COLUMN.

A quick-acting *carte* lens will be exchanged for magic lantern slides or apparatus.—Address, Manager, 19a, Royal Promenade, Bristol.

A 12 × 10 Kinnear camera, with late improvements, quite new, will be exchanged for a *carte* lens by a good maker.—Address, B. Bennett, 33, Fair-street, Drogheda.

ANSWERS TO CORRESPONDENTS.

☞ *Correspondents should never write on both sides of the paper.*

Notice.—Each correspondent is required to enclose his name and address although not necessarily for publication. Communications may, when thought desirable, appear under a *nom de plume* as hitherto, or, by preference, under three letters of the alphabet. Such signatures as "Constant Reader," "Subscriber," &c., should be avoided. Correspondents not conforming to this rule will therefore understand the reason for the omission of their communications.

S. P.—Heat is said *not* to affect nickel-plating of steel.

J. Whitson.—We regret our inability to supply what you require.

W. Vick.—The method you suggest for utilising old *cartes* is ingenious, and will necessarily prove useful.

J. Garland.—We shall be much pleased to have an opportunity of examining the shutters and catch for double backs.

J. M'Leod.—Write to Mr. Mawdsley, of the Liverpool Dry-plate Company, St. John's Hill, Clapham Junction, S. W.

Received.—E. W. Dallas; J. Horsburgh; J. Johnston (your packet received too late to be otherwise acknowledged in this number).

S. W. W.—To make a good, serviceable, plain collodion dissolve two and a-half drachms of proxyline in a mixture composed of a pint of ether and half-a-pint of alcohol.

Erratum.—In the article *On Lantern Topics*, by "Syntax," in our last number, page 548, first column, twenty-sixth line from top, *read* "lime light *reigns* supreme" instead of "lime light remains supreme."

J. W.—At present we are unable to inform you as to the number of volumes issued. If we ascertain this before next week we shall inform you. It is quite impossible to obtain the volumes from any recognised dealers.

W. Weston.—While there is much that is similar between the two, there exists a difference sufficient to warrant the obtaining of a patent. This, at any rate, is the opinion of a patent agent to whom your letter was submitted.

W. H. Wells.—Several years ago we prepared for insertion in our Almanac an article on chemical amusements, but it was "crowded out," and relegated to the pages of the Journal. See page 17 of volume xix.—that for 1872.

N. J. H.—Kennett's camera-stand is certainly one of the best portable forms. There is no patent or restriction connected with it, hence you can take full advantage of the description we gave in our number for January 14th of the present year.

Rev. G. B. Smith.—The manufacture of the "periskop" lenses of Steinheil has long since been discontinued—certainly for the last eight or nine years. The lenses which are now associated with the name of this optician are of a different character altogether, as their chemical and visual foci strictly coincide, and they work with a large aperture.

A Scot (Glasgow).—We were prevented by circumstances from carrying out the experiment in the spring as we had intended. "Parts" may be read as either grains, drachms, or ounces. In the case of grains, the fluid equivalent may be assumed to be minims. In our forthcoming Almanac there will be ample information regarding the "sizes" of plates.

Tyro.—The mistake is a natural one, and arises from the unwise arrangement in our mercantile system, owing to which an ounce of *metallic* silver contains 480 grains, whereas an ounce of *nitrate* of silver contains 437½ grains. This arises from the custom—rule we cannot call it—of selling the noble metals by troy weight, and their salts by avoirdupois weight.

A. J. C.—The following will answer your purpose:—Add two grains more of bromide of cadmium to each ounce of ordinary collodion, sensitise in a forty-grain bath, wash thoroughly, and then apply a strong decoction of coffee. Commence the development with plain pyrogallic acid. If, however, you are familiar with alkaline development you may adopt that system.

Report of the Royal Cornwall Polytechnic Society.—We beg to acknowledge the receipt of the forty-third report—that for 1875. It indicates that this energetic Society was in a highly flourishing condition at the time (February 29th, 1876) when the report was submitted, and we heartily congratulate its conductors upon the continued success of the Society.

Rembrandt.—Salt the paper by brushing it over with a solution of bromide of bromide of potassium, and when dry excite it by floating upon a strong solution of nitrate of silver to which has been added just so much acetic acid as will prevent fogging. The developer should consist of a warm solution of gallic acid. Collodion transfers are usually employed for the purpose mentioned.

Edwin Smithells.—It will be impossible to remove the varnish without destroying the collodion film. The only thing now to be done is to print a transparency from the negative, and from that transparency to produce another negative. After this has been done you may then try the following experiment with the original negative:—Place it in a flat vessel and pour upon it a mixture of methylated spirits and a solution of caustic potash; allow this to flow backwards and forwards over the surface until the varnish has been dissolved away; then gently rinse the surface with water, dry, and re-varnish.

Photolitho.—We do not at all approve of the method you have adopted of printing the subject direct upon the lithographic stone. Such a class of subject as a map ought to have been printed upon paper prepared with bichromate of potassium and albumen; and, a transfer having been obtained upon this paper, it should then have been "laid down" upon the stone. Try this, following the directions we gave in our last Almanac, and you will succeed much better than by adopting what you designate the "American" method.

F.R.S.—Before commencing your experiments in photochromy it is desirable that you should acquaint yourself with what is already known in connection with the subject. A very good *résumé* of this is to be found in the *Popular Science Review* for January, 1874, and further details are to be found scattered throughout the volumes of The British Journal of Photography. If you call at our office when you are next in London we shall be enabled to give you, *vivâ voce*, much information on this interesting subject which might not prove interesting to the body of our readers were we to print it *in extenso*.

Old Printer.—Resinised paper may be prepared by immersing good Rive paper for over half-a-minute in the following:—

Frankincense	10 grains.
Mastic	8 ,,
Chloride of calcium	15 ,,
Alcohol	1 ounce.

The paper thus prepared must be excited by floating for five or six minutes on a sixty-grain silver bath, and be rapidly dried. It yields pictures of a rich tone, possessing great vigour, yet free from the gloss of albumen. The proportions here given are those found best by Mr. Henry Cooper, who introduced the process.

New Photographic Periodical.—Mr. J. H. Fitzgibbon, of St. Louis, Mo., U.S.A., informs us that he is about to start a new journal to be designated *The Saint Louis Practical Photographer*. Mr. Fitzgibbon observes in his prospectus that he enters the field of photographic literature with a full knowledge of the responsibility and task that is before him. Journalism, he says, at the present day is rather an uphill business for the pocket as well as in the endeavour to please everybody. "If," he further observes, "we take occasionally the liberty to use western phrases in our articles, it is because we have imbibed them after a residence here of over thirty years. Business and pleasure combined generally has caused us to visit the east once a year to get polished up, but on our return the polish soon rubs off, and we shine again in our western habitual element. We propose to make this journal red hot for bogus adventurers on the fraternity, process vendors, and dead beats in general. Having nothing to lose and all to gain, we shall not be afraid to say what we think, and speak in plain language what we mean, especially about those who attempt to prey upon, or try to frighten, the practical photographer, in extorting from him his last dollar for some worthless patent or process." We trust Mr. Fitzgibbon's forthcoming journal may have a long and prosperous future.

APPLICATIONS FOR NEW PATENTS.

October 20, 1876.—"Portable Photographic Apparatus. No. 4060."—J. A. Terpereau.

November 9, 1876.—"Improvements in Apparatus for Taking a Succession of Photographic Pictures and for Exhibiting the Same. No. 4344."—W. Donisthorpe.

November 11, 1876.—"Construction of Photographic Studios. No. 4385."—R. Slingsby.

LONDON GAZETTE, *Tuesday, November* 21, 1876.

Petition for Liquidation by Arrangement.

J. W. Miell, Chippenham, photographer.

METEOROLOGICAL REPORT,

For the Week ending November 22, 1876.

Observations taken at 406, Strand, by J. H. Steward, Optician.

These Observations are Taken at 8 a.m.

Nov.	Bar.	Wind.	Wet Bulb.	Dry Bulb.	Max. Tem.	Min. Tem.	Remarks
16	29·42	S	55	57	62	51	Dull
17	29·79	W	50	52	58	50	Dull
18	30·09	SW	51	52	57	47	Dull
20	29·73	NW	46	49	51	45	Dull
21	30·00	N	44	46	50	43	Dull
22	30·29	SE	42	45	—	43	Dull

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THE BRITISH JOURNAL OF PHOTOGRAPHY.

No. 865. Vol. XXIII.—DECEMBER 1, 1876.

AMMONIO-NITRATE OF SILVER.

From "time immemorial," to speak photographically, the double salts of silver have found uses in photography, though, perhaps, owing to the existence of a doubt as to their real advantages and the trouble entailed in their preparation, none of them have ever come into very general use. The best known and, apparently, the only useful salt of the series is the one mentioned at the head of this article; but since the introduction and general adoption of albumenised paper even that has almost entirely gone out of use, though at the present time an attempt is being made to introduce a new salt which, if not identical in composition, is at least very similar in its character to the ammonio-nitrate. Recent occurrences in the photographic world, but principally the course of experiments we have been following in connection with Mr. Johnston's new salt—the composition of which is, so far, a secret—have induced us to diverge into a series of experiments with the *real* ammonio-nitrate of silver, or, at least, the preparation known to photographers by that name.

As most of our readers will be aware, the solution of this substance is usually prepared for photographic purposes by the addition of strong liquor ammonia to solution of silver nitrate of the requisite strength. The first effect of this addition is to cause a dense precipitate of oxide of silver, which, however, is soluble in excess of the precipitant; the method, therefore, consists in adding the ammonia gradually, drop by drop, stirring, the while, until the precipitate at first formed is just redissolved and the solution becomes clear. In this state the mixture found frequent use in sensitising plain paper; but, as we have stated, when albumenised paper came into vogue it gradually dropped out of use owing to its solvent action upon the albumen surface. When properly prepared the solution contains but the faintest trace of free ammonia, and it is probable that its solvent action upon pure albumen would be very feeble in that state; when, however, the double salt is decomposed by the formation of chloride of silver in the albumen film the ammonia is at once set free and rapidly dissolves both the albumen and a portion of the silver chloride already formed.

One of the chief peculiarities of the salt which Mr. Johnston proposes to use is this solvent action upon albumen. Under ordinary circumstances contact with alcohol or silver nitrate produces coagulation of soluble albumen; but by using the double salt not only is the albumen not rendered insoluble by the action of the silver, but a very considerable quantity can be introduced into collodion without coagulation. The power thus conferred will, we anticipate, be found to form the principal feature in Mr. Johnston's process.

But to return to our own experiments. A small quantity of silver nitrate was dissolved in twice its weight of distilled water, and ammonia cautiously added, drop by drop, until the solution, when well stirred, remained perfectly clear. At this stage, though quite clear, the solution had a faint brown tinge, and smelled distinctly of ammonia; it was transferred to a small capsule, evaporated at a gentle heat, and set aside to crystallise. During the earlier portion of the time occupied in the evaporation a small quantity of free ammonia was driven off, and the liquid became slightly darker in colour, without, however, depositing any precipitate or losing its original clearness. The resulting crystals were dried upon blotting-paper, and were found to be quite colourless, though until freed from the dark-coloured mother liquor they appeared to be of a dirty black. When compared with a sample of Mr. Johnston's salt, supplied to us by that gentleman, a great difference in appearance was noticeable; although somewhat similar in shape our crystals were much smaller than Mr. Johnston's, and were also cleaner and drier, and, though these slight discrepancies might arise merely from slight variations in the conditions of temperature, &c., under which the respective samples were made, a distinct impression remained on our mind that they were not identical in composition.

Having satisfied ourselves of the possibility of the formation and the appearance of the crystals, the remainder of our experiments were performed without having recourse to the evaporation of the ammonio-nitrate solution, except in the case of a collodion emulsion where we made use of the crystals already obtained. In forming this emulsion we followed as nearly as possible Mr. Johnston's instructions, substituting ammonium bromide for the cadmium salt, and our own preparation of silver for Mr. Johnston's. Twelve grains of bromide of ammonium were dissolved in a very small quantity of water, and added to half-an-ounce of absolute alcohol; ten grains of pyroxyline and one ounce of ether were then added to form the bromised collodion. Twenty-two and a-half grains of ammonio-nitrate of silver were then dissolved in twelve minims of water, and the solution added to three drachms of *warm* absolute alcohol and poured gradually into the collodion. A fine emulsion was at once formed, which, after a few minutes' vigorous agitation, was set aside to ripen, but only, unfortunately, with a similar result to that experienced on former occasions when using Mr. Johnston's salt. We have since, however, stirred in a quantity of albumen froth, which appears to improve the emulsion by giving it more body, though it is not yet sufficiently improved to be workable.

We next repeated our experiments with gelatine in place of collodion, using ammonium instead of cadmium for bromising. In this case also, in place of Mr. Johnston's salt, we used ammonio-nitrate *solution*, not the crystals. Sixty grains of gelatine were allowed to soak in water until swelled, and then dissolved by means of heat; twenty-five grains of bromide of ammonium and sufficient water to make the bulk up to two ounces and a-half were then added and thoroughly mixed. In a small glass flask forty-two grains of silver nitrate were dissolved in three drachms of cold distilled water, and ammonia added, drop by drop, until the solution became quite clear. The flask was then placed over a Bunsen's burner and the liquid allowed to boil for two or three minutes, to drive off as far as possible the free ammonia. As in the former case, the solution became slightly discoloured, but remained perfectly clear; it was poured while still hot into the bromised gelatine and thoroughly mixed. A splendid emulsion was immediately formed, characterised by the same richness of colour which we have mentioned upon previous occasions when using the ammonia salt. The bottle was placed in a vessel of hot water and allowed to remain for about five minutes, when, upon examining it, we were disappointed to find that the colour of the emulsion by transmitted light (when allowed to flow down the side of the bottle) was entirely changed, the rich orange tint having given place to a dull pale brown. It was evident that

the free ammonia was operating powerfully upon the physical character of the deposit of silver bromide, which continued to change colour for about twenty minutes, when the maximum effect appeared to be produced.

The emulsion had now acquired a semi-opaque appearance, which prevented its colour being judged, as before, while in the bottle, so a small quantity was poured upon a plate and permitted to set; the film when viewed by transmitted light presented a brilliantly-clear *violet* colour. This colour, which was much more distinctly marked than we have ever seen it before, has invariably been associated with films in which the deposited bromide is in a state of comparatively coarse division. In the present instance, however, such did not appear to be the case; for the film was in point of thinness and fineness in no way inferior to ordinary gelatine plates. The most curious portion of the story, however, remains to be told. After washing in cold water, the plate was reared on its end upon a piece of blotting-paper to dry, and when examined about an hour later it was found that the edges of the film which had become dry had assumed a *bright ruby tint* slightly inclining to crimson, while those portions which remained moist still retained the former violet colour. Unable to account for the change of colour, we re-wetted the whole of the film in order to discover whether the colour was dependent upon the presence or absence of moisture—conditions which are found to affect the colour of collodion films to a slight extent. In this case, however, the ruby tint proved to be permanent; in fact, it appears that the film having been once dried no amount of subsequent soaking in water will restore the original violet colour.

It must be understood that in speaking of the various changes in the colour of the emulsion we refer solely to its colour by transmitted light, and not to the well-known yellowish white it presents by reflected light; the latter remains unchanged throughout. These various changes point clearly to some very decided action exercised by the free ammonia—an action, indeed, which at first sight led us to think that Mr. Johnston's salt differed materially from the ammonio-nitrate. Further reflection, however, makes it tolerably clear. The discrepancy in behaviour (if we may so call it) between the two arises, probably, not from any difference in the salts themselves, but from the different salts used to bromise the respective emulsion. Thus the gelatine emulsion we described last week contained bromide of cadmium, which, after sensitising with the ammonio-silver salt, resulted in the formation of insoluble oxide of cadmium in the emulsion—a substance which, if not absolutely inert, is not likely to possess any *chemical* action upon the silver bromide.

In addition to oxide of cadmium, in last week's emulsion, it is certain that some free ammonia existed in the emulsion, but its quantity must have been extremely small. In the emulsion described above, however, the quantity of free ammonia would be exactly equal to what was used in making the ammonio-nitrate of silver; for it is evident that upon the formation of silver bromide the liberated nitric acid would seize upon its due equivalent of ammonia, which would be the exact quantity contained in the decomposed bromide of ammonium. Unlike cadmium oxide, ammonia is a very powerful solvent of silver bromide, and its presence in considerable quantity is sufficient to account for a very great difference in the behaviour and appearance of the two emulsions; but which, if either, will eventually prove more useful we cannot yet say. Meanwhile, as another alternative, it would be well to try the effect of bromide of *potassium*.

The effect of an addition of albumen to gelatine emulsion in the presence of free silver nitrate, or before the whole of that salt has entered into combination, can be well imagined by those who are familiar with the action of silver upon albumen. For the benefit of those who have not tried the experiment we may be allowed to describe it. To a solution of gelatine of suitable strength—say about twenty grains to the ounce—let one drachm, or less, of undiluted albumen be added, in addition to the proper quantity of soluble bromide. When the silver is added the effect will be to cause the formation not only of silver bromide, but also of innumerable minute specks or clots of insoluble albumen and albuminate of silver mixed, which, however valuable they might be if present in a finer state of division, are worse than useless as they are. If, however, for silver nitrate we substitute ammonio-nitrate, no such clots appear; the emulsion is perfectly even, no matter what quantity of albumen may be added. This we have proved by actual practice, and we find that, in addition, the action of the ammonia upon the silver bromide is less marked. If it should eventually prove that gelatine or other emulsions prepared with the ammonio-silver salts are otherwise workable, it cannot be doubted that the possibility of thus availing ourselves of the use of albumen will form a very great recommendation in their favour. We shall continue our experiments in this direction, and, as soon as we are in a position to do so, shall give our readers some information upon the working powers of these emulsions.

Since writing the above we have received from Mr. Johnston the promised sample of his emulsion, which certainly is very different from anything we have been able to prepare with the new salt. In colour it is, as we have described upon former occasions, a rich orange, while as regards structure it appears to possess more of the characteristics of gelatine or albumen than collodion. We have not yet had an opportunity of testing it out of doors, but have tried its qualities in transparency printing, and so far find it give very satisfactory results. There is evidently something in Mr. Johnston's formula upon which, apparently trivial as it may appear, success in making the emulsion depends.

LANDSCAPE ENLARGEMENTS.

It will be generally conceded that there is fashion in photography as in most other things, and that, in its trade aspects, the tide of its prosperity is subject to ebb and flow, as in trades generally.

Photographic portraiture—which, for a considerable period, suffered from what we may call a surfeit of *carte de visite*—has, during recent times, received a great impetus from the degree of perfection which has been attained in the production of enlargements by several of the now well-known processes. We are, of course, aware that much of the beauty and, consequently, the growing popularity of such pictures depend on the skill and judgment with which the apparently absolutely necessary "retouching" and "touching-up" is done; but there can be no doubt that, judging from the specimens so frequently met with in photographic saloons, on the walls of our exhibitions, and in private collections, works of a high class, in this direction, is the rule rather than the exception.

But while the process of enlarging has done much for photographic portraiture it has not been utilised to anything like a similar extent in the landscape department of photography. It is true that enlarged landscapes are occasionally to be seen, but they have not attained to the popularity they deserve—a fact to be accounted for in this way: an enlarged portrait is almost invariably a commissioned work, while an enlarged landscape must be made by the publisher, who looks for his reward in effecting a sale to whoever may take a fancy to the picture.

The demand for good landscape work is undoubtedly very large; but the great majority of the prints sold—even those up to 12×10, or larger—are, as a rule, confined within the covers of albums or portfolios, or they are much too small for wall decoration, unless the subject be very special or the circumstances peculiar. Now, although a print from a 12×10 negative be too small for hanging on the wall, an enlargement of four diameters, or 24×20, would be an ornament irrespective of subject; and such pictures, if good, and properly introduced, would command a ready sale.

In the case of enlarged portraits we have said that much depends on judicious touching and retouching; but such manipulation is much less applicable to enlarged landscapes, and therefore the originals must, for first-class work, be taken with a view to that purpose. It is quite true that a fair enlargement may be made from any very excellent printing negative; but, as we have repeatedly urged, for high-class work the negatives should be taken *for* enlarging—the exposure, development, and manipulation generally all requiring to be so modified as to produce the tone and other necessary qualities. That negatives, however, *not* taken with this special end in view

may, in skilful hands, produce enlargements of the highest class will have been apparent to those who saw the magnificent enlargements obtained from Mr. J. Stuart's Spanish negatives and Captain Abney's Egyptian negatives, to which we directed special attention in one of our critical notices on the pictures in the photographic exhibition recently closed.

That such enlargements will command purchasers we have no doubt, and in that respect the affair, so far as it goes, is satisfactory; but many, probably most, of our best operators work for fame as well as for fortune, and in some cases more for the former than the latter. To them the present tendency to give credit to the enlarger rather than to the artist by whose taste, manipulative skill, and judgment the original was produced is somewhat discouraging; and we think they are only seeking what is fair and just when they demand that the artistic skill combined with technical ability required to produce a high-class negative should receive, at least, as much acknowledgment as the almost purely mechanical ability involved in the production of the enlargement.

Certain complaints, we understand, have arisen in regard to one of the conditions imposed by the committee of the exhibition about to be opened at Edinburgh, where certain medals are offered for enlargements which must either be the work of the exhibitor or made on his premises. In connection with this, one gentleman, after describing to one of the most energetic and able officials of that society, our Edinburgh correspondent, the kind of negative best suited for enlarging, explaining how it may be produced, and showing that from such he has been able to get enlargements much better than anything that could be printed from the originals, pertinently says:—"And yet because it is convenient to me, and best answers my purpose, not to make my own enlargements, I am debarred from competition. In other words, although the quality and character of the enlarged landscapes are due alone to the quality of my negatives, the producer of the enlargements would be able to show my negatives and get all the credit." On making inquiry we find that what the committee, in framing the regulation, had in view was the encouragement of enlarging generally, and thought such object could be best effected by inducing photographers to undertake the work themselves; but it is likely that, for a considerable period at least, such work will be generally confined to those who make it a speciality, and who, in consequence, are willing to provide suitable apparatus on a sufficiently extensive scale. This being the case, we think it is only fair that, while giving all due credit to the care and skill required to produce good work, the proper credit should be given to the artist by whom the subject was chosen, and to whose ability we are indebted for the kind and quality of negative from which alone the very highest class of enlargements can be made.

Mr. Sigmund Singer, in an article which we reprinted last week, provides photographers with one more new method—or, rather, series of methods—for correcting an emulsion which has reached the "foggy stage" through the presence of free silver. Mr. Singer starts with the idea that to be in perfectly workable condition an emulsion should be free not only from excess of silver, but also from soluble haloids—a view which we certainly do not endorse, to commence with. In order, therefore, to bring about the proper "correction" Mr. Singer recommends the use of certain "insoluble salts" having "an affinity for silver." Now, we very much question if any one of the three salts he mentions can, under the circumstances, be considered as insoluble. Though, perhaps, insoluble in absolute alcohol or ether, it must be borne in mind that an emulsion usually contains a considerable proportion of water, which is capable of exerting its solvent power upon the constituents of the emulsion despite its mixture with alcohol and ether. In addition, we are inclined to doubt whether, even in the face of Mr. Singer's injunction to omit any acid which may be included in the ordinary formulæ, it is possible to secure neutrality of the mixture; and it is evident that, if any trace of acid be present, two at least of the salts he proposes will be immediately attacked. If those substances be insoluble they must also be inert; if they be, on the contrary, soluble, foreign matter is introduced into the emulsion, which may or may not produce an injurious effect. Of the three salts mentioned by Mr. Singer chloride of sodium is certainly the least objectionable; but where is the advantage gained by adding a "few lumps" instead of a grain or two in solution. Carbonate of lime we should most decidedly discountenance; for, even granting that the carbonate of silver formed is innocuous, what shall we say of the very serious risk of spots and pinholes incurred through the possible presence of carbonate or nitrate of lime in the film? As regards cyanide of potassium we can only say that we fully accept Mr. Singer's statement that it will "dispose of" the free silver in a very short time, and we can also understand its alleged "caustic" action upon the collodion, but we should not be inclined to place much reliance upon an emulsion so "corrected." If these sort of methods are to continue increasing in popularity as they have done lately, especially amongst a certain class of our transatlantic brethren, the sooner we adopt the plan of mixing the whole of our chemicals in one bottle, and trust to the laws of nature and chemical equivalents to watch over the result, the better.

HOT DEVELOPMENT FOR GELATINO-BROMIDE PLATES.

The advantages to be derived from raising the temperature of the iron developer, more particularly in cold weather, are well known; but a similar treatment of the alkaline developer is, if not a novelty, at least not generally practised.

During the past summer I worked a good deal with gelatine emulsions, and tried many of the published formulæ with considerable success. In connection therewith I also experimented with various modifications of the alkaline developer; but eventually came to the conclusion that the proportions as given by Mr. Kennett in the directions for developing his plates were about correct.

The two great defects of gelatine plates are, without doubt, a tendency to blistering of the film during the progress of development and a difficulty in obtaining the density required in a good printing negative. I do not propose here to enter on a consideration of the causes of these defects, but proceed to describe the treatment I adopted for their cure.

A developed gelatine negative will resist the action of hot water for a considerable period, the film remaining in a leathery and insoluble condition without any tendency to blister or separate from the glass. This peculiar property led me to think that if, previous to development, the soluble film could be converted into a similar condition some important ends might be attained, not the least being the ability to employ a warm developer.

The leathery character of the finished negative being mainly due to the action of the pyrogallic acid in the developer, I proceeded to make use of this agent for the purpose.

A plate prepared according to "Franklin's" formula having been exposed, a four-grain solution of pyrogallic acid in cold water is applied to the film with a tuft of cotton wool. When the pyro. appears to have permeated the film the solution is poured back into the developing-glass and the plate plunged into water heated to 90°, where it is allowed to remain a minute or two. The plate being removed from the water an alkaline developer, prepared according to Mr. Kennett's formula, but with water of the same temperature as the bath, is applied. The image now rapidly appears, showing the high lights in great relief, due to the great expansion of the gelatine by the hot water. Should the image not acquire sufficient density under the alkaline developer alone, it may be intensified with the usual acid-silver redeveloper. This solution may also be used warm. After development the plate may be washed with either warm or cold water. There is some advantage in using the former, as a smaller quantity suffices. The plate is fixed with hyposulphite of soda, and, finally, thoroughly washed with cold water.

The foregoing is the method I have followed in the production of some negatives I have submitted to the Editors for inspection. I do not advance it as the best, but it has been successful beyond my expectation.

In using this hot development I have met with no blisters. I have purposely used an intensifier containing a larger dose of citric acid and silver than ordinary—a course which would have infallibly produced a plentiful crop had the usual cold development been employed.

The rapidity of the plates is much increased. A plate exposed on a difficult interior for one hour, a doublet lens stop $\frac{f}{24}$ being used, and the light dull, produced a fair negative. An attempt to photograph the same room, using the same plates, lens, and stop, and with double the exposure, ended in failure when the ordinary method of development with cold solutions was employed.

In developing the successful negative of this interior the preliminary pyrogallic acid was applied for a minute or two, drained off, and the plate placed in the tray of warm water. I was surprised to see the image rapidly appear in all its detail, requiring but a slight application of the alkaline developer to complete the picture.

This fact of being able to commence the development with a solution of plain pyrogallic acid is of great importance. Hitherto the development of a gelatine plate has been rather a "leap in the dark"—all the directions I have seen recommending that the development should be effected with a strong solution containing the full proportions of bromide and ammonia, when, if the exposure have been correctly judged, all may go well; but, if not, there is little chance of a successful result.

The use of the warm system of development permits of considerable latitude of exposure. By the behaviour of the plate under the action of the pyrogallic acid and hot-water bath the sufficiency or otherwise of the exposure may be judged, and the further development modified accordingly.

Whether it would be possible to effect the development by the use of acid silver alone I cannot at present say; but, judging from the strength of the image produced by the pyrogallic acid aided by the warm bath, I think it very probable. This latter method might prove useful in the case of a very much over-exposed negative.

J. D. Lysaght,
Lieut. 102nd Royal Madras Fusiliers.

COPYRIGHT.

Probably not even the subject of "patents," about which the photographic world is considerably exercised just now, is of more importance than a correct appreciation of the rights conferred by the Copyright Act of 1862, inasmuch as a very much larger number of persons are interested in, and affected by, that statute.

In your article of November 24th, on *Copyright and Copyists*, some remarks are made which I do not think fully borne out by the wording of the clauses in the Act referred to; and, as no greater misfortune could occur than that any member of the profession should be led into error through any inadvertence of the Editors, I trust that you will not take exception to the further ventilation of this subject.

In the first place, it may be well to ask the question—"What object had the legislature in view in passing the Act of July, 1862?" (not July, 1863, by the way, as quoted in your article). The reply to this is given in the preamble to the Act itself:—"Whereas by law established the *authors* of paintings, drawings, and photographs have no copyright in their works, it is expedient that the law *in that respect* should be amended."

Who, then, is the "author" of a photograph? Surely there can be but one answer—"He who produces it." Permit me, therefore, at once to raise the question that "*all* copyright in a photograph is vested in the person on *whose behalf* or at *whose request* it was executed." Do not for one moment think that I mean to imply that because a photographer has become the producer or "author" of a portrait or other subject, at the request of a third party, he should be entitled to make whatever use he may choose of such a production for his own personal benefit, or to the detriment of those who gave him the commission. My object is to show what steps are essential to be taken to ensure the proper conveyance of the copyright to the parties entitled to the same, and to give them the legal status to hold and to dispose of it. You quote the first clause of the Act correctly enough as far as it goes, but I cannot help thinking that the succeeding paragraph places the matter in a very different light. Let us see:*—

"The *author* (being a *British* subject, or resident within the dominions of the Crown) of every original (painting, drawing, or) photograph (which shall be or shall have been made, either in the British dominions or elsewhere, and which shall not have been sold or disposed of before the commencement of this Act, and his assigns, shall have the exclusive right of copying, engraving, reproducing, and multiplying such (painting or drawing and the design thereof, or such) photograph and the negative thereof, by any means and of any size, for the term of the natural life of such author, and seven years after his death; provided that when (any painting or drawing, or) the negative of any photograph shall, for the first time after the passing of this Act be sold or disposed of, or shall be made or executed for or on behalf of any other person for a good or a valuable consideration, the person so selling or disposing of or making or executing the same shall not retain the copyright thereof unless it be expressly reserved to him by agreement in writing, signed, at or before the time of such sale or disposition, by the vendee of (such painting or drawing or of) such negative of a photograph, or by the person for or on whose behalf the same shall be so made or executed; but the copyright shall belong to the vendee or assignee of (such painting or drawing, or of) such negative of a photograph, or to the person for or on whose behalf the same shall have been made or executed; *nor shall the vendee or assignee thereof be entitled to any such copyright unless at or before the time of such sale or disposition an agreement in writing, signed by the person so selling or disposing of the same, or by his agent duly authorised, shall have been made to that effect.*"

Now the concluding paragraph, which I have italicised, puts, I think, a perfectly different construction upon the matter to that conveyed in the article in this Journal, for it would seem to say that the author of the work, if he sell it, should not retain the copyright, unless he makes a written agreement with the vendee; and so likewise the vendee is not entitled to the copyright unless a written agreement shall have been signed by the vendor conveying it to him.

Whether this be right or not is not now the question; what I want to show is how the *law* stands at present; and, having had some very considerable experience in this matter, especially with regard to the photographing of paintings and other works of art, my opinion may not be altogether valueless.

It would, therefore, appear that in by far the largest number of instances—as when a sitter presents himself to a photographer, and sits for his portrait—*no* "copyright" exists. It is different when a photographer requests a sitting from a "celebrity," for in that case he can register, as the *author*, the portrait he may take. And he must be particularly careful, if he take more than one negative, that *every one of such negatives be registered*, the slightest variation being sufficient to invalidate a claim under this Act. This was upon one occasion, I think, disagreeably discovered by the proprietor of a registered portrait of one of the royal dukes. The defendant, in the proceedings brought against him, showed a slight discrepancy between the registered photograph and the one he had copied, though both were stated to have been taken at the same sitting.

In the case of an individual going to a photographer to obtain negatives which he proposes to use (say) for advertising purposes there would likewise be no difficulty, as the sitter would no doubt have such an agreement in writing as would convey the copyright from the *author* or *producer* to himself, under the latter portion of the clause quoted above. In such a case, should the photographer issue copies from the negatives he had himself taken, he would be liable to his customer for £10 for every such infringement of the terms of the Act (clause 6).

In the case of an artist desiring photographs from his own painting or drawing (having previously secured the copyright of it by registration) no agreement is requisite between himself and the photographer, since the latter would also be debarred by section 6 from issuing any copies of the work of which he would be the "author." But in the case of a publisher desiring to issue photographs from a painting or drawing not his own production, it is well, if the copyright have not or cannot be conveyed to him—as in the case of an old painting, or one executed by a foreigner out of this country—that an agreement be entered into reserving the copyright in the *photograph* to himself. Much useful information on this subject will be found in the pages of The British Journal of Photography, vol. x., 1863, pp. 146-47, being the report of the committee on copyright to the Edinburgh Photographic Society.

It is in the case of the ordinary transactions between sitter and photographer that some hardship seems to be inflicted, though it is probable that this is a good deal overrated. It does seem hard—and it is so—that a photographer, having produced a good negative and supplied prints to his customers, should find the latter sending off his picture to be copied at the "half-crown-per-dozen" shop; but, then, they are literally two-penny-halfpenny things that no one having the least judgment or taste would do anything with except throw behind the fire, and now that the public have got to be such excellent judges of what photographs *ought* to be the trade in such productions must die out. In the hypothetical case of the local stationer and the Earl of Beaconsfield, I strongly suspect that both parties would be too wide-awake to let any such proceedings be at all probable.

There are some other interests to be considered in this matter besides those of the photographer, and a "hard and fast line"

* In quoting from Acts of Parliament it is well to give them in the exact words of the statute; but we can draw special attention to the salient points by bracketing the more formal and "repetitive" portions, so that they may be omitted in reading. Moreover, as I wish now to draw especial attention to the question as relating to photographs, I exclude in this manner unnecessary reference to paintings and drawings.

would sometimes interfere with those of *the public.* Suppose that *no* portrait *could* be copied without the incurring of a penalty, many of the best and best-known of the profession would occasionally have to suffer. A wealthy client, for instance, having had several portraits of himself and of his family taken at various times, takes it into his head, perhaps, that some of them might be advantageously made into finished pictures or enlargements by some well-known house. The majority, perhaps, of these portraits have been taken by this house, and the negatives are readily accessible to them except one—and that perhaps of the best-loved one of all; where is *that* negative? Alas! the only portrait is a half-faded *carte,* or the glass "positive" taken, as a joke, on the beach at the seaside, while she was in the full bloom of youth and beauty, before a fatal illness wrought its havoc. Must not *this* be copied "by any means and of any size?" or, to be copied at all, must it be placed in the hands of the original "author" to make a picture to compare with and to hang beside such works of art as *are* produced nowadays?

Another point occurs with reference to non-registered portraits, which form the staple of those produced. Because a portrait is not copyright is a photographer, having the negative, justified in issuing a single copy except to his sitter's order? Most certainly and emphatically—*No!* A photographer who would use for his own purposes a negative he might have in his possession would be as great a *culprit* as a printer who, having a book set up in type, should sell copies of the work he has printed, whether registered at Stationers' Hall or not, or a lithographer who should print and sell copies from his stone. And yet the type and the stone are no more or less the property of the printer than the negative of the photographer. He has taken it as a "means to an end"—a means of obtaining a certain number of copies—with this difference: that whereas the type and stone are valuable, and to retain them in form would involve much expense and require enormous room, the photographer keeps his glass—which is comparatively valueless and occupies little or no room—merely in case his client may require a "second edition" at a later time. At the same time he should be no more called upon to deliver the glass to his client than the printer to be expected to send home a cart-load of type, or a few hundred-weight of stone, with the copies printed from the one or the other.

J. A. Spencer.

[It is evident that Mr. Spencer has not correctly applied the last proviso in the clause to which he refers; inasmuch as he has not observed that the terms "vendee or assignee" only are employed, and are not followed by the words "or the person on whose behalf the same has been executed." That portion of the clause only refers to the case of the sale of a *negative,* and not to that of the sale of a *photograph.* A word with respect to the "two-penny-halfpenny things" that may be produced by the proper copying of a *carte.* It is now a matter of history that one of the *finest* specimens exhibited by M. Lambert was an enlargement produced by copying a *carte* portrait of a lady; it was "untouched," and all who saw it averred that it was impossible to have obtained such a picture direct. Hence copies are not necessarily bad photographs. On the whole Mr. Spencer endorses our own article on the same subject.—Eds.]

NOTES ON PASSING EVENTS.

By a Peripatetic Photographer.

Apropos of an article on copyright in portraits, there is a phase of the subject, in its commercial aspect, upon which photographers would be none the worse were it to receive a little ventilation. I refer to the legality of printing the word "copyright" upon portraits which have no right to be so designated. It is well known that some London (and possibly also some provincial) photographers are in the habit of mounting portraits in which they have no copyright—nor in connection with which have they gone through the cheap ceremony of entering them at Stationers' Hall—upon mounts supplied to them by the thousand, and bearing the word "copyright" emblazoned thereon. Is not this a fraud punishable even in the great metropolis, in which, people say, whether rightly or wrongly, there is one law for the rich and another for the poor? I wish some one, who has no fear of headache arising from wading through and trying to interpret the meaning of the Acts of Parliament bearing on the question, would inform me, and also the public at large, if it be not penal to publish an invention as "patented" when it has not been secured by patent, or a picture as "copyright" when it is not so entered.

What a racy journal that will be which is about to be started by Mr. J. H. Fitzgibbon, of St. Louis! He has (he says) nothing to lose, but all to gain, and is to make his journal "red hot" for a certain class which scandal or rumour avers is numerically very strong in the United States of America. Added to this he is going to utilise such phrases as the native taste of the "far west" has adopted as an improvement upon the English language as spoken in more old-fashioned localities, and it is fair to presume that his correspondents will adopt a similar vernacular. I can imagine one of the certain class aforementioned upon whom the editor has been down with "red-hot" castigation replying something after this fashion:—

"I feel konsiderbul riled at yer base attak upon a innersent indirvidooul wich I red with no ornary feelins of indignashun and shagrin Bizness is bizness and what did yer think I guv yer my vartsment for yer cust noospaper onct a month if yer warnt a goin ter injooce yer reeders ter bi my invalerabl fixin likwid wich the Noo Yorkers is morn harf crazy ter diskovr. O yes Ill kawl on yer and ef I hevnt a six shooter in my poket," &c., &c.

May Mr. Fitzgibbon have few such correspondents as this typical one! But I *do* think that a "six-shooter" will have to rank among the "fixins" of his editorial sanctum if he have the courage to carry out his intended editorial programme.

The South London Technical Meeting, from which so much was expected, has without doubt proved a failure. What is the cause? Mr. Tulley says that it is to be found in the debarring of secret and patented processes from being introduced. In saying this he is doing some violence to his memory; for he could scarcely have altogether forgotten that the gelatino-bromide process had been "spoken about" at the meeting to which he alludes until it was considered to be blocking the way and preventing the introduction of matters respecting which the fullest information was proffered to the Society. To devote a whole evening to the discussion of the merits of a thing about which the inventor, in so many words, said, "I shall not give you any information," was thought to be supremely absurd. I rather incline to attribute the failure of the recent technical meeting to the apathy displayed in the well-being of the Society by many of its leading officials, who throw too much work upon the shoulders of an already overworked Secretary. Some portion of the blame must also rest on the members generally, who at a recent election ousted from an office of honour—unthinkingly, if you like, but none the less really—the one man to whom the success of the previous meetings was mainly owing.

I here beg to give a kick to a ball which is rolling in a praiseworthy direction—the prevention of the destruction of oxygen gas bags. Chlorine is the great enemy of these bags, and although the oxygen generated from the fusion and decomposition of chlorate of potash is nearly pure, still there is, as a rule, a trace of chlorine mixed with it. In every instance where oxygen is prepared from chlorate of potash it is passed through water. Hyposulphite of soda possesses a similar amount of friendship for chlorine as a terrier does for a rat; and, at first sight, it would seem as if the passing of the oxygen through a solution of hyposulphite of soda, instead of through pure water, would suffice to eliminate from it any chlorine with which it has become contaminated. To do this, however, the oxygen must be made to ascend through the de-chlorising liquid—not in the big bubbles in which it invariably *does* ascend, but in a fine stream of minute bubbles, causing an otherwise large bubble of gas to be broken up into a great number of small ones, and thus allowing a greater area of the chlorine-impregnated oxygen to be submitted to the action of the fluid through which it bubbles. How is this to be done? Very easily. Let the delivery tube that dips into the wash-bottle be made of thin brass, place it in a slanting direction, and let it be pierced with a large number of small holes from the lower end upwards to within an inch of the water level. This will ensure the oxygen escaping from a large area of the delivery tube in a great number of minute bubbles rather than from the end of the tube in one large bubble.

"Save me from my friends!" may Mr. R. Manners Gordon well exclaim. Some one had got hold of certain old pictures by this gentleman and had them placed in an exhibition intended to show *recent* progress. The intention was doubtless excellent, but the transaction cannot be justified. Mr. Gordon has a reputation to sustain; photography is rapidly advancing. Mr. Gordon's pictures of a few years back were excellent in their day; but is it judicious to exhibit the works of a former epoch (epochs in photography are measured by months, or, at any rate, by twelvemonths) as something for the admiration of the exhibition-haunting public of 1876? But I forbear saying more, because Mr. Vernon Heath, who returned my thrust of last month with well-intended force, might again pitch into me, and say that pictures which public criticism averred to be *perfect* a few years ago must still, of necessity, be "perfect"—beyond which who can go?

In the course of my wanderings round the world I chanced to call in upon the members of the Photographic Society and their friends when, in "evening dress," they on a recent occasion were busily employed in the examination of the pictures at the exhibition now closed, and indulging in social chat while investigating, experimentally, the quality of the creature comforts provided for the refreshment of the inner man (and *wo*man—why not?) at the south end of the room. I was pleased to see among those who were thus enjoying themselves such veterans as Dr. Millar, George Shadbolt, and others; and how disappointed was I, on the other hand, to notice that the parties recently deposed from the management of the affairs of the Society—"the *clique*," as Major Russell used so unctuously to designate them—were very conspicuous by their absence! What is now up among this quarrelsome and thin-skinned body of photographers that their Secretary has been compelled to retire from his position?

HINTS ON PERMANENT CHROMOTYPE PRINTING.

After some twenty years' business experience in photography I ventured into the new trade of carbon, and became a licensee of the Lambertype and chromotype processes.

I took my instructions at the Autotype Company's works, and, getting back to Salisbury, began in right earnest to try my hand at the work. It must be confessed that for a few weeks I found many difficulties, and began to feel that I had tackled a troublesome process, with, perhaps, a regret or two that I had not stayed at home and kept the money in my pocket. However, perseverance changed all that, and, beginning to feel I have been as successful with this beautiful process as most of the licensees, I am proud enough to believe my experience may furnish a few useful hints to others, and therefore I venture to write to the Journal.

Having worked my way through the inexperience and carelessness and mismanagement that beset beginners, my belief now is that chromotype printing is more simple and more certain than silver, that it gives greater brilliancy and finer tone than it is possible to obtain by silver, and that the prints are obtained in less than half the time. Added to this is the important fact that the public appreciate the chromotype for its beauty and its permanent quality; and I can truthfully say since I have adopted this process that I have nearly doubled my business, get a higher price for my work, and give the greatest satisfaction. I had but one set of lessons at the autotype works, and, although I found the company very willing to give me information in writing after the first month, I have managed to get along by my own endeavours, and my way of working is this:—

Sensitising the Tissue.—In the hot weather I used one ounce of bichromate of potash to thirty ounces of water, adding ten drops of ammonia; or the company's sensitiser to thirty ounces of water, and, on the whole, preferred it. Now we have come to dull light and cold weather I employ one ounce of sensitiser to eighteen of water. I sensitise every evening, in a bath of this strength, as much tissue as is wanted for the next day. I immerse the tissue for about thirty seconds, keeping it always on the move, and pass my hand merely over the surface to remove any dust particles, instead of the sponge recommended by M. Lambert. When sufficiently sensitised, as is ascertained by the tissue having a tendency to curl upwards, I simply draw it across the edge of the line or tin dish, then lay it upon a curved blotting-pad, face upwards, to dry. I keep a lamp burning in the room all night, which gives a gentle heat that allows the tissue to dry somewhat slowly, but still to have it quite ready by the morning.

Printing.—On exposing the tissue I use the ordinary tin achrometer with sensitised paper, and, after a little practice, one need be seldom wrong. It is convenient to make the number of tints required on the negative after printing for future use. I prefer Durand's sensitised paper to any other, and find that, with proper care, it will keep good for a couple of months.

Developing.—Here, I believe, is where many chromotype printers get puzzled and make the most mistakes. The first thing to avoid is not to begin the development with water above 85°; the heat may soon be increased as the picture washes up without any harm. The grooved tank recommended by M. Lambert I do not believe in, but use good deep block-tin dishes, and keep adding hot water as the developing goes on, finishing with it decidedly warm, as it cleans the picture up to perfection. I found quite clearly that putting the plates into a tank to develope with the water as hot at the beginning as at the finish somehow or other damaged the tissue. You may use nearly boiling water without harm at the finish of the development, but anything over 100° will damage the picture at the commencement; therefore I use no tank except for my supplies of hot water. After development I wash the prints well in clean water, and fix them in solution of alum—eight ounces to one gallon of water.

Transferring.—Too much care cannot be taken to see that the tranfer paper is properly soaked. I had as much to puzzle out at this point as anywhere. If you do not soak long enough your print shows a quantity of bright specks. I now use fairly hot water and soak for nearly five minutes, and after the transfer I fill the plates, one upon another, with several thicknesses of blotting-paper between and keep them under pressure for an hour before stripping. I get very few spoiled prints and waste but little tissue. I do not care to send my prints out with the full gloss of the collodion, but mount and roll them in the usual way. I take the liberty to send a few for your inspection. The enamelled surface is too delicate and tender for my liking, and the extreme gloss is not every person's taste.

Practically the process has become in my hands, instead of a complicated one, easy and certain. I have a clever young printer, and there is no difficulty in turning out the work. I think these facts and hints may be a little useful to encourage and help others through difficulties. If others will try it thoroughly I venture to say they will not regret the cost of a license, but will soon do what I hope to do in the coming spring—put on my cards, "Nothing but permanent photographs sent from this establishment." I have the exclusive chromotype license for this town, and must say I am delighted with the process. I would not part with my experience and the license for a great deal more than they cost me.

C. J. Witcomb.

NOCTES WASHINGTONIA.

No. V.

Stripping and Transferring Negative Films.

Mac.: I remember on one occasion, when I was at Naples, a gentleman who resided in the same hotel showed me a large number of film negatives he was taking home from an amateur photographer in Kurrachee to have printed in this country. While I admired the exceeding portability of these films I could not help thinking they were too thin to be efficiently employed in the printing-frame.

Little Harry: Could they no be plaistered on a glass plate and be used in a decent fashion?

Tom: Of course they can, and many a one have I used in that way.

Mac.: Don't "cut before the edge," but tell us first in what way they should be removed from the glass plate upon which they were originally produced.

Per. Phot.: The subject naturally divides itself into three parts—the removal of the film from the plate, the attaching it to paper either as a temporary or permanent support, and the fixing it to glass to be more easily printed from. In connection with the first of these, it cannot be too strongly insisted upon that an acid favours the removal of the film from the glass. Here is a negative film which adheres as closely as possible to the glass, and yet I have only to place it in this vessel of water, pour into the water a few drachms of sulphuric acid, and wait patiently for a few minutes, when, unless I am much mistaken, the film will be found to have left the glass and to be floating in the water.

Mark Oute: Is sulphuric acid necessary for this purpose? Would not nitric acid do as well?

Per. Phot.: Yes, nitric acid would answer; but it is liable to this objection—that it has a solvent action upon the silver forming the image, and might cause mischief to the half-tones, whereas sulphuric acid has no such deleterious action. But many other acids may be used instead of sulphuric; citric and hydrochloric acids have frequently been employed by me, but sulphuric acid is as good as any other.

Mac.: I observe the film coming away from the glass already. How is it to be washed and preserved?

Per. Phot.: I raise it gently from the glass by two corners, and place it in a dish of plain water, from which I raise it up and transfer it to a sheet of blotting-paper, covering it with a second sheet, and pressing the two together. This dries the film, which can now be freely handled.

Mac.: But, as I said before, it is of too fragile a nature to be utilised in printing, is it not?

Per. Phot.: Not so fragile as you imagine. Just try the toughness of the pellicle; it will be found to be much tougher than could have been believed.

Little Harry: It seems as if it wad answer brawly for printing wi' the wrang side next tae the paper.

PER. PHOT.: So it does; and herein lies one of the great advantages of such a kind of negative. It solves the problem of making a negative useful for two purposes, namely, silver printing and carbon printing by single transfer; for, as you know, an ordinary negative when used for this kind of carbon printing gives a reversed print, whereas a pellicle negative prints equally well from either side, hence you can have it reversed or non-reversed just as you like.

MAC.: The portability of the negative when in this form is what I am most pleased with, for I can see its advantage when applied to dispensing with a quantitiy of glass plates when one is travelling far away from home, and it enables one to keep all his negatives in a book or folio without any danger of their being cracked.

M'EDIN.: But would it not be advantageous if they were cemented to paper? For, if the paper were made transparent, you would have all the advantages of the collodion superadded to those peculiar to the paper negative.

PER. PHOT.: Just so; and the method I am now about to adopt will demonstrate that it is not only easy but advantageous in many cases to remove them to paper. *Here* is a sheet of paper that was sized by being floated for a few seconds upon a solution of gelatine in water—an ounce to a pint. Now I make this paper wet with water, and I also wet the surface of the negative. I now press the two into close contact and leave them to dry; but, as we cannot wait till this occurs, I have another negative ready, and brought up to this stage and dried. I now pass this wet sponge over the back of the paper adhering to the negative, and when it is well moistened I take hold of it by the corner and strip it off. Look! you see that the collodion has left the glass and now adheres to the paper. This paper is in this instance only plain writing paper; but it might be rendered transparent by waxing, in which case it would not show texture. It may be used for printing; but if the collodion film be placed next to the printing paper the image will be reversed—the proper condition for carbon printing.

MARK OUTE: But could it not be re-transferred to glass, supposing one felt so inclined upon returning from a tour?

PER. PHOT.: Yes; it is not at all difficult to do so. A plate of glass having been gelatinised with gelatine *plus* chrome alum, and dried, is immersed in water, and the paper negative also made wet, and pressed into contact with the glass. When dry it is immersed in *warm* water, which causes the paper immediately to part company from the glass to which the pellicle is now found adhering with great tenacity. I submit these three specimens to your notice.

Omnes: Most successful! [*Exeunt.*

FOREIGN NOTES AND NEWS.

AN INTENSELY ACTINIC LIGHT.—HERR ROTTER ON THE ELIMINATION OF HYPOSULPHITE OF SODA.—CELEBRATION OF DR. HORNIG'S (OF VIENNA) TWENTY-FIFTH YEAR AS PROFESSOR.—NEW PHOTOGRAPHIC SOCIETY.—FORTHCOMING EXHIBITION AT AMSTERDAM.

AN old, school-boy, chemical experiment is now going the rounds of the foreign journals as a means of obtaining a very brilliant, perfectly-white, and very actinic light, which may be used for taking photographs:—Place some perfectly dry, powdered nitre in a suitable clay vessel, and in a cavity made in the middle of the powder place a piece of phosphorus and ignite it. While it burns the nitre melts and a quantity of oxygen gas is given off producing an intense light.

In writing upon that ever-recurring subject, the elimination of hyposulphite of soda from silver prints, Herr Rotter, of Dresden, stated that every photographer knew that the indispensable hyposulphite of soda was the photographer's greatest enemy, and that the most varied contrivances had been invented in order to eliminate it completely by washing from the fixed picture; but a little reflection showed that in this way all that was obtained was a greater or less dilution of the soda, part of which was sucked up and retained by the spongy fibres of the paper, so that even after long-continued washing some traces of the fatal stuff still remained. It was, therefore, natural that one should endeavour to remove the hyposulphite by chemical means, namely, powerful oxidisers, which change the dangerous hyposulphurous acid into harmless sulphuric acid.

Hydric peroxide, which was first suggested for this purpose, could not be used on account of its instability and its doubtful effect upon the organic matter present. Just as little could a solution of iodine be recommended, as, in addition to its poisonous properties, it was apt to form iodide of silver so as to discolour the whites of the picture. On the contrary, all requirements were fulfilled by the *eau de javelle*—that is, the spotting-water of washerwomen, which costs about 2½d. per litre—of Herr Günther, of Berlin, and which is really a solution of hypochlorite of soda. This gave off the oxygen of the hypochlorous acid to the hyposulphurous acid; the chlorine thus set free combined with the hydrogen of the water to form hydrochloric acid, and the oxygen set free from the water went to the hyposulphurous acid, which was thus changed in a few minutes to sulphuric acid. The operation was exactly the same as when hyposulphite was used as a bleaching agent, only that in our case, when the durability of the fibres of the paper was not in question, an excess of hypochlorite of soda must be present. One proceeds as follows:—Immediately on removing the pictures from the soda lay them in water containing about twenty cubic centimetres (one table spoonful) of *eau de javelle* to three litres of water, and when removed from this water place them in another bath of the same composition. At the third removal they may be placed in pure water, and are then ready to be taken out and dried. They do not fade at all in these baths, and come out of them brilliant in the whites. On account of the shortness of the time the pictures are in the water they are uncommonly brilliant, and the blisters, often so troublesome, are perfectly harmless. In a word, we are informed that whoever has tried this simple, thorough, and cheap process will never use another. It is especially cheap for those photographers whose supply of water is limited and dear. We need scarcely remind our readers of a few years standing, that this method of eliminating hyposulphite of soda has been very fully ventilated in this Journal. It was introduced by Mr. F. W. Hart in June, 1866; and "eliminating" solutions, since that time, have been kept in stock by one or other of the metropolitan stock dealers.

Dr. Hornig, of Vienna, editor of the *Photographische Correspondenz*, and President of the Vienna Photographic Society, celebrated on the 13th current the twenty-fifth anniversary of his appointment as professor. He has just been presented by the Berlin Photographic Society with a large album, containing the portraits of 226 of the members of that Society, as an acknowledgment of his kindness in sending to each of them, every January, a copy of his photographic annual.

The same journal announces the formation of a new photographic society, having its head-quarters at Cologne, to be called the "Rhenish-Westphalian Society for the Cultivation of Photography and Allied Arts." The *Photographischen Monatsblätter* is to be its official organ.

The *Photographische Correspondenz* of the 14th November announces that an exhibition of art and applied art, under one of which heads photography is included, is to be held in the Palace of Industry at Amsterdam during the months of June, July, and August of next year. Intending exhibitors are requested to make known their intention not later than the 1st of November, 1876; but, as the *Correspondenz* naïvely remarks, it is to be supposed that intimations of an intention to exhibit will be accepted after the day fixed, as it had already passed before the announcement of the exhibition had reached it, and presumably other technical journals also.

Our Editorial Table.

MEN OF MARK. By GEORGE C. WHITFIELD.
London: SAMPSON LOW AND CO.

WE now redeem the promise made in the course of our notices of the pictures at the recent Exhibition, and devote a short space to giving a more detailed account of *Men of Mark* than was possible at that time.

Those who desire to see what the Woodbury process is capable of producing when worked at its best can certainly have their wish gratified by a perusal of this work. It will be remembered that the Woodbury Company exhibited a series of portraits of men who had achieved eminence in various walks of life—in politics, theology, and soforth; and it will also be remembered by those who saw these portraits that the brilliancy, depth, purity, and perfection of half-tone were such as to have induced several spectators to observe that it was impossible that works so charming could have been produced by a mechanical printing process; yet such is the case.

Men of Mark form a gallery of contemporary portraits of men "distinguished in the senate, the church, in science, literature and art, the army, navy, law, medicine, &c." In the present work—the first of a consecutive series of volumes—there are thirty-six portraits of men coming under the above voluminous category, each portrait accompanied by a page of descriptive text, by Thompson Cooper, F.S.A. It is, however, in the photographs we are more particularly interested. They have all been photographed from life by Messrs. Lock and

Whitfield, and are, without exception, charming examples of what photographic portraiture should be. It is somewhat difficult to select any for special notice; but while the portraits of the Earl of Dufferin, Sir Garnet Wolseley, Lord Talbot de Malahide, and the Right Hon. John Bright will most likely gain the suffrages of all who admire extreme brilliancy, by those who like to revel in soft, harmonious half-tones, not devoid of bold, crisp touches, the photographs of the Right Hon. Henry Bouverie W. Brand, M.P., Lord Selborne, Sir Bartle Frere, and Cardinal Manning may be preferred. In every instance the lighting and posing have been such as to depict the facial lineaments in the highest perfection.

Mr. G. C. Whitfield, under whose superintendence this volume has been produced, deserves great credit for the felicitous manner in which he has managed to associate in one "happy family" the distinctive characters of which it is composed; for, as no special attempt at classification seems to have been intended, so there are no invidious distinctions observable in regard to priority of place. Churchmen and catholics, liberals and conservatives, and people holding the most diverse phases of opinion — all are mixed together very harmoniously.

This volume, so replete with gems of portraiture, should find a place on the reception-room table of every photographer, as well as take a distinguished position among the pictorial treasures usually found on the table of the private drawing-room.

Meetings of Societies.

GLASGOW PHOTOGRAPHIC ASSOCIATION.

A MEETING of this Society was held in the Religious Institution Rooms, on Wednesday, the 22nd ult., — Mr. John Stuart, President, in the chair. The attendance of members and friends quite filled the large room.

The minutes of the previous meeting having been read and approved, four new members were elected.

The CHAIRMAN said that before commencing his address he wished to say that there were two gentlemen present—one from London and the other from Edinburgh—who were most worthy representatives of their art, viz., Mr. Jabez Hughes and Mr. J. G. Tunny. He was glad to see them present, and was sure every member would give them a hearty welcome. (Applause.) He (the Chairman) then delivered the following address, which was listened to with marked attention:—

ALTHOUGH not, strictly speaking, the opening meeting of the session, be good enough for the time being to consider it so. Allow me to thank you most sincerely for the honour you have conferred upon me in unanimously electing me to be your President. No one can feel more strongly my shortcomings than I do myself, and I feel them the more when I look around me and see so many more gifted and who could have filled the chair with credit to the Society and honour to themselves; still I yield to no one in an honest desire to forward anything that pertains to our beautiful art. Having said thus much of myself I wish now to say something to you, so that our meetings may be profitable.——In the first place: be regular in your attendance; feel, as it were, that the life of the Society hangs on your shoulders. Should you at any time have any thing new, or which you consider new, to bring before the Society read up your journals, think over it, make notes of it; and by so doing you will interest those who listen, and do much to advance your own knowledge of our art. In the second place: give me your sympathy and indulgence, that our meetings may be conducted in order. Let your motto be—"Chair." I am bound to assume that I have your confidence. I will do all that I can to retain it, and when I lose it I will cease to be your President.——Phœnix-like, having arisen from our ashes and started anew into life, with every prospect of it being a long and a healthy one, it may not be out of place if I try, as it were, and bring you down to date, taking a hurried glance as to how we stand. Like the business man who has let his books go behind it is no easy task; still we shall try and run them over. Though there be nothing strictly new to record, still I believe we shall find that there may be new and, in many cases, better ways of doing the old thing.——Let us give a look at the optical department of photography. During the last ten or twelve years considerable changes and additions have been made to our stock of optical apparatus. The photographer has now at his disposal lenses adapted for every kind of subject for architectural—for landscape subjects (panoramic or otherwise), for groups for portraiture—some of them especially adapted to give diffusion of focus—and also a special construction for giving rapid portraits in the studio. Opticians have vied with each other in putting lenses into the hands of the photographer specially adapted for every kind of work; still, they come short of fulfilling all our desires. It may be because we look for too much from them. In passing, allow me to say how much we regret the loss to photography occasioned by the death of our esteemed friend, Thomas Sutton—a man who in his time did much to advance our art, and who took a lively interest in our Society. I believe that in the construction of photographic lenses, as far at least as regards rapidity of action, opticians have gone as far as it is possible for them to go; and it is to chemistry we must look for improvements in that respect. This now brings me to the chemical department of our art.——Has any new or previously unobserved property in chemicals been discovered? I believe not—at least not anything of importance. Many attempts have been made to find a substitute for nitrate of silver, but, I am sorry to say, without much success. That salt still plays a very important part in all our more sensitive processes. Collodion still holds its own, without a worthy rival, and its composition, as regards producing satisfactory results, is now reduced to a certainty. Collodion, with all its many good qualities, I have a strong desire to see follow the way of cyanide of potassium, and be for ever banished from our dark rooms. Its use in such confined spaces as we have often to work in tends very much to destroy our liver, and render us an irritable and peevish crew. Every photographer, amateur and professional, should set his brains to work to find a good substitute for collodion. I am not without hope that we may find, ere long, that gelatine will serve our purpose for the production of negatives. I need hardly tell you that the production of negatives on gelatine films is not new; but, as yet, we have not been able to obtain such an amount of sensitiveness, combined with uniformity of action, as to bring it into general use. I do not think it a bad idea that some of you should take up the subject of gelatine as a substitute for collodion in your leisure hours, working it out, and bringing the results before the Society during the present session. In fact, at every meeting you might report progress and state difficulties, and thus you would get the united wisdom of the members to assist you. I make this suggestion the more readily as I see a goodly number of young men among us, and I look with hope to them to raise our art to a higher pitch than it has yet attained in the present generation of photographers, who have almost all of them been trained in early life to some other occupation, and, consequently, lack that early training which is essential to all genuine advancement. Pardon this digression. I am happy to say that all our developing and fixing agents are procurable in a comparatively pure state. Chemists have found it profitable to give some attention to their production, enabling us to procure good chemicals at about as many pence as we formerly paid pounds for them, and it only now remains with us to manipulate those chemicals to the best advantage.——Positives—that is, pictures produced on silver plates, glass, or iron—have almost disappeared from amongst us, so I will not take up your time on this head; though, in passing, I may say that I think their disappearance is to be regretted, and to some extent is a mistake. What in our art is more beautiful or more permanent than good daguerreotypes, collodiotypes, or ferrotypes? Within the last few days I have been informed that ferrotypes are becoming popular again, and I am glad to hear it. Very often I have passing through my hands daguerreotypes produced in our city twenty-five years ago, by that father of photographers, Jabez Hughes, and whom I am delighted to see amongst us tonight, looking as hale and hearty as in days of yore. They make my heart yearn within me like an old man for the loves of his youth. I can only exclaim—"Alas! those days are gone, giving place to photography in another phase, and, under the name of 'retouching,' hiding what is beautiful in nature, and turning 'the human face divine' into a mere haggis or, if you like it better, the wax figure in a barber's shop, and which a crowd of empty-headed patrons persist in calling 'beautiful!'" I do not set myself up as a prophet, but I feel that the time is not far distant when a reaction will take place, and the photographic portraits of the present day will be as much despised as are the pothouse oil paintings of our forefathers; and the cry will be—"Give us genuine photographs,—real photographs!"—which render the features in their native beauty, and from which we may read the characters of our ancestors with truthfulness. I feel strongly on the subject of retouching, and will do everything in my power to banish it from our art. As at present carried out it is a disgrace—faces being as white as shirt-fronts, and like the face of a hungry boy against the window of a baker's shop at early morning. I think I hear some one say—"Very good; but how are we to do without retouching?" Daguerreotypes or collodiotypes required none of the so-called "retouching" or "remodelling," and what is to prevent us from producing picures on paper of the same character as those that I have referred to? The attainment of this end ought to form one of the principal objects of our Society. However slow our progress may be, let us still keep this object in view, and let our motto be—"Excelsior."——The next subject which claims our consideration is the production of negatives. As a developer or reducing agent for negatives protosulphate of iron has held its place amongst a host of competitors. On the whole it is pretty generally acknowledged that protosulphate of iron is one of the most certain and satisfactory of reducing agents. It has been tried in combination with a great variety of other salts, as also with sugar, gelatine, alcohol, and glacial acetic acid. Some of these, no doubt, have increased the intensity of the image, but have not reduced the time necessary for the exposure; and, from practical experience, I have no hesitation in declaring that

pure protosulphate of iron, with a minimum of glacial acetic acid, is one of the most uniform and satisfactory of developing agents. For afterwards intensifying the film sulphate of iron is not so useful as pyrogallic acid. A host of intensifying agents have been suggested, but none of them have stood the test of time in a manner at all equal to pyrogallic acid. Of course I do not here refer to the intensifying of negatives copied from black and white drawings, which require a special treatment; but to enter fully into that subject would require more time than is at my disposal.——Readers of the journals—and I trust you all are—know what a host of dry processes we have had brought forward, and over which many mighty men have fought and fallen. Still I am safe in saying that professionals consider the wet process more useful for them. I suppose that arises from its being more certain in its results, though the working of it entails considerably more labour at the time, especially in outdoor work. For amateurs there is no question but that one of the dry processes would be the best; for when they contemplate a trip to the country for the purpose of taking views they have nothing to take on their journey but a camera and a few dark slides, thus saving considerable time on the way, and the old saying that "time is money" can be fully realised by those who have stayed at a Highland hotel for a few days. What little experience I have had with dry processes has not been favourable to them as regards sensitiveness. Another difficulty which I have had to encounter is the blurring more or less visible in taking such negatives as dark interiors. Some little time ago I tried some dry plates much advertised in the journals on the interior of a very dark church, and, after giving four days' exposure, I found that the detail was so deficient as to render the negative of no use; so I tried a wet plate, and with three hours' exposure procured a negative having much more detail, and which printed tolerably satisfactorily. I have made a number of experiments lately with emulsions, and with a fair amount of success. I look forward to yet having an emulsion process which will work with all—nay, more than all—the certainty of the wet process; and to professional photographers the dispensing with the use of the silver bath would be a considerable advantage.——In rapidity of action we are still in the same spot we were in fifteen years ago. I think this is to be regretted, as it is in rapidity of action that my hopes for the future of photography lie. I can see how, if we were able to take photographs in a thousandth part of the time at present required, we could raise our art—and that even with our present optical appliances—to something like equal terms with our brethren of the brush. Just think what a power it would give us, as we could then reduce the diaphragms of our lenses to such an extent that we could hope to have something like focus over the whole field. Oh! to photographers what a delight it would be to catch that fleeting but bewitching smile on the face of the fair maiden placed before you—or, it may be, to catch the moving multitudes as they pour along our streets! Need I go further in my description of what we could do? The thought of it almost sends me into a frenzy. Oh! ye spirits of the great departed!—Daguerre, Wedgwood, Davy, Niepce, Archer, and Sutton—will ye not come up and tell us how this is to be done, and we shall hold a perpetual *séance* to your memory, and put to silence such men as whisper, when they hear of you—"*Spirits of turpentine!*" (Laughter and applause.)——Another thing worthy of our consideration is how little has been done to render the coloured rays on the plate as we see them visually. It must have been your experience when asked to take a photograph for some brother of the brush that he has been quite surprised—yea, horrified—that the negative was so unlike what he expected when he placed his sitter. He had put the subject in such a light as he would have done to paint from, forgetting that the chemicals will not render the light as he sees it. To rectify this state of matters is truly work for our societies to accomplish. Think on it, then—bring your thoughts together on the subject—and there is no saying what may be the result.——Having produced the negative it must be printed, so as to produce a positive. There are now many printing processes in use, and a goodly number more have been tried and found wanting. There are so many that it is quite out of my power to name them all; so I will content myself with bringing under your notice a few of them. The albumenised paper, in conjunction with the silver bath, is the process which is now in general use, and has been for many years. To name all the suggestions which have been published, and nostrums sold, for the improvement of this process would fill a good-sized volume. Withal we are left just as we were; neither in beauty of result nor in permanency have we moved one step within the last fifteen years. I am sorry to have to confess so much; but it is the truth, and there is no use shutting our eyes to it—better face it. Finally: I give it as my experience that there is no process in the whole range of our art so difficult to work steadily and satisfactorily as this albumen printing process. As regards permanency of prints by it there is no royal road to it. All alike seem groping in the dark. Some say one thing, some another; some are loud in their denunciations of the stinking albumenised paper our German friends send out, and aver that this is the great source of the fading of the prints of the present day. This is all moonshine. The Germans use nothing else themselves, and I have brought for your inspection prints on German paper executed in the year 1861 or 1862, and will leave it with you to say if they are worse now than many that are to be met with in our shop windows. I have used little else since the introduction of the *carte de visite*. I give it as my verdict that the results are more permanent than those produced on the so-called "pure albumenised paper." I have a strong suspicion that the albumenised paper prepared with glacial acetic acid (which, I believe, is added to break up the fibre of the albumen) is a fruitful source of the fading of the present day. I am sorry to say I have not been able to experiment to such an extent as to give a definite reason for thinking so, further than that I have prepared over and over again, under the same conditions, stinking German paper and that said to be prepared with the pure white of egg, having a strong smell of glacial acetic acid, with the following result:—After exposure in a humid atmosphere for six months I found that the German paper showed no change, or very little, while the other assumed a cheese-like colour in the whites, with small white spots all over, which, under a powerful microscope, showed only white paper, or albumen, devoid of colouring matter. I feel quite convinced that the fading is not the result of using the German albumenised paper, and for the cause of such fading we must look in some other quarter. I have grave doubts that we will ever be able to obtain permanency by any process which is so much dependent on the paper on which the prints are supported.——Having said thus much as regards silver printing, I will now run rapidly over some of the other printing processes. I beg to draw your attention to a book of prints which I have placed on the table for your inspection, done by Gemoser's lichtdruck for Mr. John Spencer, of Glasgow, while in Berlin some eight or nine years ago. As regards brilliancy and beauty of detail I should like you to say if you have ever seen anything better than them on albumenised paper. You will please to note that they are not printed on an enamelled surface, as prevails generally in the lichtdrucks of this country; they are seemingly printed on a fine Saxe paper having no specially prepared surface. As regards permanency they must have a considerable advantage over those printed on enamelled paper. If such work as this were done eight years ago, is there any reason why it cannot be done now? I think not. The whole reason, I believe, is that we photographers are such a conservative lot that we will not move from our old notions, and thus let many a good process slip through our fingers. Next, we have the Woodburytype—a most beautiful process coming every day more and more into use. Prints by this process I have much pleasure in laying before you, and take this opportunity of thanking the Woodbury Permanent Photographic Printing Company for placing the prints at my disposal. This printing process is a very simple one, and the results are very beautiful. I see nothing to prevent some enterprising young man starting the working of this process in Glasgow. I am sure that he would have plenty to do. Though a simple process it is somewhat expensive at the outset, as a very powerful hydraulic press has to be used for striking up the lead moulds from which the prints are obtained; otherwise there is nothing particularly expensive. At the same time I do not think that the Woodburytype is so useful to photographers as the lichtdruck, for the reason that the lichtdrucks are printed on pure paper, to which any amount of water-colour could be applied with all the facility an artist enjoys in working on plain drawing-paper. Next comes the autotype pure and simple, which I will pass over for the latest improvement in that process, viz., the Lambertype, over which photographers ran mad last season, and in the discussion of which our Society had its share. It occurs to me that some one at our last meeting said that it had been a commercial failure. What a "commercial failure" may mean I know not. Had it been only pronounced to be a failure, without "commercial" having been added to it, that might have been argued; but when it is pronounced to be a "commercial failure" the thing is too ridiculous. Anyone who cares to inquire will find that nothing in the line of photographic processes has been such a commercial success. That some individual photographers may have failed to work the process satisfactorily was to be expected. Those who saw Lambert work the process thought it would be quite an easy matter; but they forgot that all men have not the head and hands of Lambert, for he was one of the smartest and neatest-handed workers I have seen. Personally, gentlemen, I might be content to allow you to think that the Lambertype process was a failure—but that would be wrong; for I am bound to say that it has been far from a failure with me, and for a new process it has done wonders. In clever hands it is capable of great things; and I should strongly advise all who have the time to try the process during the slack winter months. One great recommendation which it has is that it will print in at least two-thirds of the time of a silver print, so that bad light need not be your excuse. Those who have no license to work the process should, I think, have no difficulty in obtaining a few samples without paying the license fee. If any members have a desire to try the process and will give me their names I shall endeavour to get this concession for them. Should the Society desire it, and there be time, I may be able to give you a practical paper on carbon printing during the present session; but I am almost afraid that you are tired of carbon printing, as it was almost the only subject discussed at the few meetings of last session. However, I am at your service. (Applause.)——With a few remarks on lighting I will bring my address to a close. Though coming last on the list it is not by any means the least, and many good papers might be written on this subject. I throw out this hint for your

future consideration. There is no department of our art which has received so much attention, and in no department has so much progress been made within the last few years; and I am proud of it, for there is nothing of so much importance than that the subject should be well lighted, be it a landscape or a portrait. A few years ago photographers could not get enough of light on their sitters; now all this is changed. Side light has almost been abandoned, and now a small top light only is used, in conjunction with a judiciously-applied reflected light to soften the shadows. To those of you who have not given special attention to top lighting I would say, "try it," and you will be astonished at the brilliancy and softness of the results. On this subject of lighting I cannot now go further, but close it by expressing the hope that we may have more of the subject during the session.——It may not be out of place, that I now, at the close, state the object which I had in view in making these remarks, namely, that I might stir up some discussion amongst you, and, if possible, provoke your attention to some of the subjects which I have named. Before sitting down allow me to thank you for the patience with which you have listened to my somewhat disjointed address. (Applause.)

Mr. URIE said he was glad of the choice the Society had made in a chairman. He knew of no one who could fill the post so well. Mr. Stuart was a great honour to the Society. With regard to the question of the carbon process being a commercial failure, it might not have got sufficient time yet; but the profession had not generally taken it up, and of those a proportion had not had much success. But there was one thing they, as Scotch photographers, ought to be pleased with—M. Lambert paid Scotland a compliment by getting a suit of the national costume, that he might appear in kilts when he got back to France. (Laughter.)

As no one seemed inclined to speak further,

Mr. ROBERTSON thought that perhaps the President might have a little delicacy in calling upon members for remarks, so he would take the liberty of doing so for him, and said they would be glad if Mr. Hughes or Mr. Tunny would favour them with some remarks.

Mr. URIE proposed that Mr. Hughes and Mr. Tunny be enrolled as honorary members of the Society.

This was unanimously and heartily agreed to, the CHAIRMAN remarking that in honouring those gentlemen they were doing honour to themselves.

Mr. JABEZ HUGHES expressed the pleasure he had of being present that evening, and of listening to the interesting and comprehensive address of his old friend, the President. While summing up the good points of the processes in general use the President had properly dwelt on the weak ones, and had shown where further improvement was necessary. The two specially weak points were—want of increased sensitiveness in producing negatives, and want of permanency in the prints. He (Mr. Hughes) had pleasure in endorsing these views, and, like the President, he urged on the younger men to cope with those difficulties and conquer them, and thus show that they were worthy of the art their predecessors were leaving in their hands. All future improvements, great and small, must be looked for from the interior. Photography had passed from the hands of the general artist and the ordinary man of science, and had a well-marked path, having a specially-trained band of its own. The art had become too intricate for the general public to understand its difficulties; only those in the inner circle could adequately appreciate them, and on those rested the duty of amending them. He did not coincide with the idea that, because the public were content with what was given them, therefore photographers should be contented too. Neither did he sympathise with the depraved cynicism that, because our work had not achieved a higher standard, therefore it merited no better fate than to fade away. The truth was that since photography had taken its place as one of the graphic arts it had incurred grave duties. Already it had extinguished miniature painting, and had seriously checked the extension of the engraving arts; and in accepting this position it was the moral duty of photographers to be conscious of the weight of their responsibility so that the hopes of the world should not be deceived by the ultimate influence of photography. The arts thus displaced yielded results that would last for centuries; if photography could only offer fading prints in their place it would inflict a lasting injury on society. As all the other graphic arts yielded permanent results when photography first came to take its place among them, it was never dreamt but that its results would be as permanent as they were beautiful; but the saddest feature of photographic history is—that is not true. Photographers have, indeed, tried hard to make their silver prints permanent, but, unfortunately, without success; and with the knowledge and experience that now exists it was hard to avoid the conclusion that permanent silver printing was an impossibility. Despite the occasional outbursts to the contrary that conviction was steadily taking possession of photographers, and the most lamentable thing of all was they seemed to accept that state of things as inevitable, and contented themselves with it. Happily there was a considerable section that were not so content, and their President was among the number; and he properly urged them to adopt another method of printing which seemed quite capable of removing that dreadful stigma from photography. He (Mr. Hughes) made some further remarks to the effect that the proceedings of the evening strongly reminded him of a similar gathering some twenty-five years ago, when, at the first photographic meeting ever held in Glasgow, he (Mr. Hughes) had the honour of reading the inaugural paper. He thanked the members for the honour conferred on him in electing him an honorary member of the Society.

Mr. TUNNY also responded.

After a few general remarks from Mr. Mactear, Mr. Gilfillan, and others,

The CHAIRMAN proposed a vote of thanks to the Woodburytype Printing Company for their kindness in sending specimens.

This was unanimously carried.

Mr. George Mason showed a large number of paper negatives and prints of the kind known as "academy" portraits, by Mr. Warwick Brooks. They were greatly admired, and a vote of thanks was recorded to Mr. Mason for taking the trouble of bringing forward these fine specimens.

The President again drew the attention of members to the licht-druck prints on the table, which were referred to in his address, and the universal acknowledgment was that albumenised silver prints were in no respect better than the mechanical prints forwarded for their examination.

A vote of thanks was most heartily accorded to the President for his admirable and practical address.

After the close of the meeting the Council and the honorary members retired to Mr. Stuart's establishment, where the gentlemen were entertained at supper. The enjoyment for an hour or two was of the most agreeable character.

WEST RIDING OF YORKSHIRE PHOTOGRAPHIC SOCIETY.

THIS Society commenced its third session on Monday, the 6th ult., at the Commercial Hotel, Bradford,—the President, Mr. John Smith, in the chair.

The minutes of the previous meeting having been read and confirmed, the Secretary read the—

ANNUAL REPORT.

IN presenting this, the second, annual report the Council have to congratulate the Society on its condition. But few members have retired, and, numerically, the Society is as strong as during the last session. Some slight alteration in the rules have been made, with advantage to the Society.

Shortly after commencing the session the departure of Mr. J. W. Gough for India caused a vacancy in the presidential chair. The Society held a special meeting for the purpose of expressing their esteem and wishing him "God speed" and success in his undertaking.

The papers read during the session have been as follow:—

On Darkness and Disease. By Mr. D. Winstanley.
The Hot-Water Process. By Mr. H. Beldon.
On Art and Photography. By Mr. J. Crosthwaite.
On Bath v. *Emulsion.* By Mr. W. E. Burrow.

Mr. Tilley, of Stafford, attended one of the meetings and gave a demonstration of his combination negative process; and Mr. Sachs obtained and exhibited a number of M. Leon Vidal's photochromes.

An excursion was held to Goit Stock, Bingley, which was numerously attended and enjoyed by all present.

As in last year, death has removed one member—Mr. A. Gledhill.

Many matters of interest have been laid before the Society in an informal manner, and at each meeting there has existed a pleasant and communicative feeling which it is very desirable to retain.

At the same time your Council feel the desirability of a certain quantity of definite matter being arranged for each evening of meeting, so as to give the members an opportunity of considering the subject before coming to the meeting, and, if necessary, experimenting thereupon. With this view your Council have prepared a scheme which will, they think, with your approval, lead to that end.

The Council beg most sincerely to thank all those who have in any way contributed to the welfare of the Society and the utility of its meetings, and would respectfully urge upon each and all to do their utmost to sustain the Society in its present state of healthy vitality.

The financial statement was then presented, which was of a highly satisfactory character.

The report and balance sheet having been passed the members proceeded to the election of officers for the ensuing session, with the following result:—*President:* Mr. J. Smith.—*Vice-President:* Mr. W. Cooke.—*Treasurer:* Mr. Passingham.—*Auditor:* Mr. A. Megson.—*Secretaries:* Messrs. Newsome and W. G. Thompson.—*Councillors* (in place of four retiring): Messrs. J. Crosthwaite, R. Holgate, R. Broadhead, and J. Gunston.

The usual votes of thanks having been passed to the retiring officers, the following was moved by Mr. Crosthwaite, seconded by Mr. Beer:—"That a ballot be taken at each annual meeting to decide the order in which members shall contribute papers to the Society's meetings, on subjects pre-arranged and recommended by the Council. Should any member feel indisposed to take the subject appointed, he may, by applying to the Council, adopt another, find an acceptable substitute, or pay a fine. The method of determining the order of subjects shall be as follows:—At the annual meeting subjects shall be announced for three meetings in advance, and at each succeeding meeting the subject for the third following meeting shall be determined and announced."

The proposition was placed before the meeting, and, after a vigorous and close discussion, passed.

A ballot of names and subjects was then taken in accordance with the resolution, and the meeting was adjourned.

THE annual *soirée* was held on Wednesday, the 22nd instant, at the Belle Vue Hotel, Bradford.

Tea was provided at 5 p.m., by Mr. Clarke, the proprietor of the hotel, in most ample and elegant style, to which full justice was done by seventy members and visitors.

A large number of pictures of very high order of merit were exhibited.

The Autotype Company contributed four frames of carbon prints from direct negatives and prints from reproduced negatives. Messrs. Chaffin and Son, Yeovil, forwarded six large direct pictures (26 × 20) of groups and single figures, which were good specimens of manipulation, *Belle and Bow* and *A Musical Trio* being the most generally admired. The Platinotype Company showed some excellent specimens of their process, which appears to be peculiarly adapted for enlargements for colouring upon, the surface taking colour admirably. Mr. Watson, of Hull, sent a few burnt-in enamels of a very high character. Mr. Sampson, Southport, exhibited a number of landscapes. A very large number of chromotype pictures were exhibited by Messrs. A. Sachs (Bradford), T. Illingworth (Halifax), and W. Smith (Leeds). Messrs. Sachs, Illingworth, and Greaves (Halifax) also exhibited a number of fine enlargements of very considerable size. Messrs. Appleton (Bradford) contributed a number of pictures. Mr. Wormald (Leeds) showed some admirable examples of his large direct landscapes (26 × 21). A few choice examples of water-colour painting, by Messrs. Megson and Arundale, contributed much towards the enjoyment of the exhibition. A magnificent shade of skeleton leaves was shown by Mr. Cussons, which drew forth, from the ladies especially, many expressions of eulogy. Mr. Warnerke sent for exhibition a large number of tissue negatives and transparencies, which were considered by many of the professional brethren present to be of very great excellence, and equal to the best that could be produced by the ordinary wet process. Mr. Warnerke likewise exhibited one of his roller dark slides, and sundry specimens showing the process throughout; also one of Jonte's combined cameras and changing-boxes, which, for excellence of workmanship and mechanical accuracy in its various movements for changing and exposing the plates, could not well be surpassed. Mr. G. Hare also sent one of his well-known changing-boxes and cameras, and a small portable camera and dark slides for dry-plate work, which fully upheld the reputation of the maker.

One feature of the exhibition was noticeable as indicating the gradual change coming over photography—with the exception of two exhibits all the pictures shown were in permanent carbon.

Some time having been spent in examining the pictures—

The PRESIDENT (Mr. John Smith) gave a short address to the assembled company, congratulating the Society on reaching its third year of existence; and, in returning thanks for his re-election to office, he mentioned the name of Mr. Gough, the late President, in terms of eulogy. He stated that Mrs. Gough was now on her way to join him. They could not forget that the last time they met in a social capacity Mr. Gough held the position of President. However permanent photographs might be made, associations could not be made equally so; but the art of the photographer went a great way in aiding their permanency. It was capable of affording intense pleasure by reviving, in a measure, the faces of dear and departed friends, and presenting to the eye familiar and loved scenes, thus affording comfort and consolation to many. The Society might congratulate itself upon a successful session. The meetings, if not productive of great novelties, had still been of much use, and of a most agreeable character; and he was proud to say that nothing had occurred during the year to interrupt the pleasant harmony existing amongst the members. The result of the year's labours was a fuller determination on the part of all connected with the Society to aid in making its future career more interesting and instructive. A duty lay upon the photographer to endeavour to elevate the public mind to a keener perception of the beautiful, which could only be done by executing conscientious and good work; and he thought, looking over the walls of the room, that West Riding photographers would compare favourably with any he had seen for artistic excellence. He thought the thanks of the Society were due to the Hanging Committee and the two Honorary Secretaries for the energetic and enthusiastic manner in which they had performed their duties, which had contributed so largely to the success of their meeting. He was also happy to see so many ladies present, and sincerely hoped to see their faces again on many future and similar occasions. He (the President) then called upon the glee party, consisting of Mrs. Crosthwaite, Mr. Greaves, Messrs. W. and W. G. Smith, Mr. Wormald, and Mr. Thompson, and during an interval there was a lantern exhibition by Messrs. Howarth and Burrow.

The usual votes of thanks having been passed to the Chairman, the host and hostess, and the contributors to the evening's entertainment, the meeting was concluded, all agreeing that they had passed a delightful evening.

Correspondence.

A NEW FILTERING PAPER.—A NEW MINERS' LAMP.

A NEW manner of folding paper for filtering purposes has just been invented here, which bids fair to throw the old-fashioned form out of the market. The paper is not cut into a round, as all the corners are employed; therefore there is a saving of paper, together with a much larger surface presented to the liquid. The funnel cannot be choked up; consequently there is a saving of time. I inform the readers of THE BRITISH JOURNAL OF PHOTOGRAPHY of this invention, having experimented upon it myself, and found all the above-mentioned qualities. Unfortunately, they are a little more difficult to make by hand than the old form, although I believe they can be more easily made by machinery, and at a lower price.

To practice making the new filter, take a square piece of stiff paper and fold it diagonally so as to form a cross, the arms of which touch the four corners. Next, crease it in lines parallel with the edges, so that it will fall in "plaits" in either direction like the bellows of a camera. Now open it out and, commencing at one corner, fold it so that the converging creases form the ridges of a sort of conical bellows, and having reached the centre of the paper repeat the operation from the three remaining corners. The result will be a circular filter, the sides of which are formed of deep angular ridges, presenting a much larger filtering surface than is the case in the ordinary manner of folding the paper. With a little practice this becomes easy; and I am certain that any of the readers of the Journal who will take the time to master the difficulty will not have to regret the loss of time.

The great loss of life occasioned in coal mines by the explosion of photo-carbonic hydrogen gas has stimulated many *savants* to seek the means of lessening the number of such accidents. Davy's lamp has been of immense service, but it has not always prevented an explosion—not from the fault of the lamp, but, in general, from carelessness on the part of the miner. M. J. Coquillon has discovered a singular property which palladium possesses, viz., that it can be raised to a red heat, in a mixture of gas and air, without causing explosion. The dangerous gas itself feeds the combustion, and is thus consumed. The discoverer is about to invent a new miners' lamp upon this principle, by using which no danger need be feared, and which will give warning, at the same time, of the presence of the dangerous gas, so that the miners will have time to escape from its influence.

3, *Place Bréda, Paris, Nov.* 28, 1876. E. STEBBING, *Prof.*

THE BEECHEY PLATES.

To the EDITORS.

GENTLEMEN,—Seeing some reference to the Beechey plates in your last number of the Journal, I am induced to add a few particulars as to their keeping qualities under various conditions.

On the 7th of August, out of a batch I was then preparing I took four, which we will designate respectively by the letters A B C D. Two of them, A and B, I dried with the preservative upon them; C and D I thoroughly washed free from the preservative. I then exposed A and C, leaving them after exposure in a drying-closet, while I went from home for a month. On the 7th of September I exposed the other two, B and D (all four being of the same stock subject—my garden), the subject including a building with trees, and *all* came out equally well.

There was no more difficulty in getting detail and density with the washed plates than with the unwashed. I was very much pleased to find how well the plates developed a month after exposure. My experience leads me to say that unless these plates are backed there is a great tendency to blurring.—I am, yours, &c., C. F. C.

The Vicarage, Blandford, Dorset, November 27, 1876.

THE SOUTH LONDON PHOTOGRAPHIC SOCIETY.

To the EDITORS.

GENTLEMEN,—I am inclined to think that the failure of our last technical meeting is to be attributed solely to the want of proper publicity being given as to the date.

Of course we, the members of the minor society—who reverently follow the footsteps of the influential and useful Parent Society, whose *assistant* secretary is our *honorary* secretary—must not expect that our Secretary can devote too much of his time to organise a technical meeting just at the time when his services are in request at the annual exhibition of the Photographic Society of Great Britain. It is true the *minor* society did appoint a sub-committee to help the Secretary; still, if he cannot, for want of time, carry out the suggestions made by that body, the South London Photographic Society must make up their minds to put up with the extinction of our annual technical meeting or else to have a secretary *all* to themselves.—I am, yours, &c.,

November 27, 1876. A MEMBER OF THE COMMITTEE.

A CENTENARIAN.

To the EDITORS.

GENTLEMEN,—The enclosed portrait was taken by me on the first of this month, in an ordinary room and without the assistance of any head-rest. I simply mention this to the credit of my sitter, whose name I am not at liberty to divulge, because, as she told me, she and all her family have always had a great objection to notoriety of any kind.

I may tell you that I first made the acquaintance of this lady when she was eighty-five years of age. I photographed her for the second time when she was ninety; for the third time when she was ninety-five; and I then expressed a hope that I might do her homage on her hundredth birthday by photographing her at her own residence and offering a bouquet of flowers for her acceptance. The hope has been fulfilled and the promise kept.

But the most extraordinary part of my narrative has yet to be told. Some three weeks after she had reached her hundredth year I had the pleasure of sitting with her in her drawing-room, and in the course of a pleasant conversation I learnt that she enjoys perfect physical and mental health, reads and writes without spectacles, and learns poetry by heart as a recreation. She has an excellent memory, and remembers all that has happened since she was ten years of age. She belongs to a good old Liverpool family, is a lady by birth and education, and has very decided opinions on matters of politics and fashion. In one day she received sixty-three visitors, and was able to see her friends and converse with them all. A young friend of hers, as she told me with a smile, who is only eighty-five, came all the way from Manchester to congratulate her; and, as he is of a different shade of politics to hers, she took occasion to speak in unmistakable terms of disapproval of a high personage with whose origin and history she is thoroughly conversant, and who is well known in liberal circles. I may add that when she was over ninety-six years of age she met with a serious accident: she had a dangerous fall, which would certainly have proved fatal to many much younger than herself; but such is the nature of her constitution that after a few weeks she had completely recovered.

In remembrance of the first of November she has presented my young son with a handsomely-bound book in which she has written an inscription in a firm and legible hand. This good lady is unmarried, and is one of a family of sixteen children. In an old family Bible, large size, where all the names of her brothers and sisters are entered also, I have read opposite her own name—"Born October 8th, 1776!" I can see no reason why another decade should not be added to the already great number of her years—a consummation, which if it be for her happiness, I sincerely wish her.—I am, yours, &c.,

Liverpool, November 27, 1876. C. FERRANTI.

[The portrait in question is a noble tribute to the value of photography. Mr. Ferranti's letter contains an idea on which we would like to say a few words. Some persons have a "craze" for being weighed periodically, say once a year; others cherish the more laudable desire of being photographed at stated intervals—say of four or five years—in order to make a collection that will portray them as near as possible from the cradle to the grave. These progressive portraits possess unspeakable value, and one cannot easily subject such a series to examination without emotion. Photography, although still in its infancy, is yet old enough to have produced portraits, at varying intervals, of an individual as a baby, a child, a girl at school, a maiden in all the flush of health and strength, a matron, and—a corpse! Such a series we examined a few days ago; who can estimate its value to surviving friends?—EDS.]

ANSWERS TO CORRESPONDENTS.

☞ *Correspondents should never write on both sides of the paper.*

EXCHANGES.—In our next.

C. F. C.—It will be very useful indeed.

*** We have been compelled, through pressure on our space this week, to leave over several articles till our next issue.

CHESTERFIELD.—If you will heat the solution of citric acid to boiling point it will prevent its decomposition for a long time. Decomposition is believed to be induced by organic germs, the vitality of which is destroyed by the treatment here suggested.

J. W.—Mr. Forrest, of Liverpool, at one time prepared (and doubtless does still) a description of glass having a peculiar brown colour that was very non-actinic. We had a small sample of it, and from an experiment we made we concluded that it was much superior to ruby glass.

P. P. (Greenock).—The great failure in most attempts to colour lantern photographs is found in the selection of transparencies that are too strong and dark. Let the picture be very light, and put in the deep shadows with the brush, using opaque colour for the deepest touches.

GEO. PAXTON.—The simplest method by which to obtain prismatic eye-glasses of the kind mentioned is to purchase a large spectacle lens of eight inches focus from any of the dealers in such goods, cut it in two with a diamond, and, by means of soft iron pliers, chip each piece into a circular form.

CHROMOTYPES.—Mr. Witcomb, of Salisbury, has favoured us with three charming *cartes* printed in carbon by the process he describes so lucidly in another column. The surface is of the kind that may be fittingly described as a glossy mat, which is very effective; for, wanting the glassy smoothness of an enamelled print, it is not liable to become scratched.

SILVER (Glasgow).—A silver article cannot be distinguished from one that is plated unless (*a*) by the stamp, (*b*) by scraping the surface and applying some kind of testing fluid, the best being a solution of nitrate of silver which becomes quite black when applied to brass or nickled silver, but is not discoloured by real silver. It will not prove profitable for you to reduce the silver from the articles mentioned.

JUNIUS (Birmingham).—Mr. G. W. Priston and Messrs. J. W. Small and Co. are our Melbourne agents. To ensure regularity of delivery (at least till you become settled) perhaps the best plan is to order the Journal at our Publishing Office, paying the subscription and postage for (say) six or twelve months. It would reach you regularly by every mail. Till your residence is fixed it might be addressed *poste restante.*

REV. B. S.—For photographing such an object as the dreadful *pulex irritans* a mechanical stage to the microscope is not necessary. It is, however, a convenience, and all the adjustments may very easily be made by the hand; for as the objective that must, of necessity, be used is one of a low power, the motion of an object upon the stage of the instrument is not magnified to such a degree as would render the operation of adjustment at all a difficult one.

OBLIGED.—To transfer an old print to stone, the first operation required is to soften the ink. This may be done by steeping the print in a hot solution of caustic potash (caustic strontia is said to answer still better). In about five or ten minutes the ink will have become sufficiently soft to "set off." The print is next washed in water, placed in a vessel of diluted nitric acid, blotted off, and transferred to the stone. This is a mere outline of a process upon which a very long article might be written; but it cannot be said to come within the province of a journal devoted to photography.

THE REV. F. HARDWICH writes to us on a subject that possesses much interest at the present time of the year, namely, that of condensers for magic lanterns. He casts certain queries into a fourfold form. These are as follow:—"1. Is the condenser achromatised by giving the two lenses suitable curves, and, if so, are most of the condensers sold of good quality?—2. On holding the condenser to the window bars, and forming an image thereof, I notice that if I form the image *by the centre* it is achromatic, but if by the edges of the condenser it is fringed with prismatic colours. Is this right? When I do the same thing with my Derogy portrait objective there is not a trace of colour at the edges nor at the centre.—3. Three and a-half inch diameter—what should be the focal length for distant rays?—4. In my Derogy lens, five and a-half inch focus, two and a-quarter inch diameter, the glasses are further apart than in my *carte* lens of the same focus. Now I find that in using the former I can bring the lime spot as near to the condenser as two and three-quarter inches with good effect; but with the latter three and a-half inches is the nearest admitted of without producing blueness of disc. Please explain, as I wish to see whether my views are right."——In reply: Lantern condensers are very seldom made achromatic, but some forms give more colour than others. The best form consists of a plano-convex (or, by preference, a meniscus, the flattest side of which is very slightly curved, and which at first sight appears to be plano-convex) and a double convex lens. These must be mounted in such a manner as that the flat side should be nearest the flame. This gives a disc that will be illuminated in a very even manner and free from prismatic colours. Some lantern makers ignorantly turn the flat side of the condenser next to the picture; but inequality in the illumination is sure to result from this practice. A portrait objective will not show any colour under the conditions mentioned by Mr. Hardwich, because it is *achromatic.* If a three and a-half inch condenser be *well* made the light might be placed at a distance of two inches from the first surface, but we have never seen more than one condenser that possessed such perfection as this; such proximity of the flame is, however, very apt to fracture the condenser. The last query of our esteemed friend must *at present* be left unanswered, as it would require a diagram. In a private note Mr. Hardwich has suggested the desirability of our writing a short series of articles upon the optics of the magic lantern. This we shall have pleasure in doing, and none the less in consequence of having had *numerous* similar applications from other correspondents.

FORGING BANK NOTES BY THE AID OF PHOTOGRAPHY.—On Wednesday last, the 29th ult., at the Lancaster County Police Court, Alice Waller, *alias* Higgen, was charged on remand with forging and uttering £5 bank notes, purporting to be notes of the Lancaster Banking Company; also with being in possession of five forged notes and photographic appliances for manufacturing such notes.—Superintendent Jervis stated that since the prisoner's apprehension he had discovered half-a-dozen clear cases of uttering forged notes, and he had selected two for investigation that day. Evidence in proof of the charge was then given. The police, on visiting 6, Radcliffe-street, Preston, where prisoner and her mother had been lodging, discovered a camera, negatives of the forged notes, and all the necessary appliances for photographing. Mr. F. Ellis, a photographer, of Lancaster, deposed that to all appearances the notes had been made from the negatives found at prisoner's lodgings. Both the negatives and prints had been taken in halves. The notes, which were joined together at the back, had evidently been greased or oiled to give them the appearance they presented. In her defence, the prisoner said, "I am guilty of passing the notes, but I declare before God that I am not guilty of making them." Prisoner was committed for trial at the next Lancaster assizes. It has been ascertained that about six years ago she was married to a lieutenant in the royal navy, but that they have not been living together for some time.

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THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 866. Vol. XXIII.—DECEMBER 8, 1876.

OUR FORTHCOMIMG ALMANAC.

The Editor of The British Journal Photographic Almanac, in formally announcing its being in the course of preparation, reiterates what he has said in former years, namely, that in order to secure the effective preparation of such a work, calculated as it is so largely to benefit the entire brotherhood throughout the world, the hearty co-operation of all fellow-experimentalists and friends is desirable. He, therefore, once more invites them to send him, *at their earliest possible convenience*, such hints on practical matters, and notes on difficulties encountered and overcome, as well as their ideas on subjects generally interesting to the readers of photographic literature, as will enable him to present so complete a *brochure* for 1877 as will, in utility, surpass even its successful predecessors.

As an advertising medium it is without a rival; and, being retained as a standard work of reference in photographic matters, advertisers will find their announcements more permanent than in the case of serial publications, while it is also true that the Almanac finds its way into many studios and on to the library tables of amateurs where the usual weekly journals may fail to gain regular recognition. For these reasons it is recommended to the notice of advertisers as the most valuable medium for popularising their various business announcements. Terms and other information may be obtained at the Publishing Office, 2, York-street, Covent Garden, W.C., or from the advertising columns of this Journal. Early application is absolutely necessary in order to secure precedence.

HARDENED GELATINE FILMS AND HOT DEVELOPMENT.

Lieutenant Lysaght's communication in our last number, upon the subject of *Hot Development for Gelatino-Bromide Plates*, recals some old experiments of our own in a similar direction, some of which we have repeated since perusing the article in question. We say "in a similar direction," because our experiments were made more with the view of improving the working capabilities of the gelatine emulsion in hot weather or in a tropical climate than with the object of utilising hot development, which, according to our experience both with collodion and gelatine, will be found less convenient and manageable, except for special purposes, than the ordinary form. The nature of the experiments, however, necessitated the employment of solutions of various degrees of temperature in order to produce, artificially, effects resembling as far as possible the conditions of a hot climate.

We were led to this line of research by the observation, which all gelatine workers must have made, that a developed film will bear a considerably higher temperature without solution than an undeveloped one; and it appeared to us probable that if the same state could be induced previous to exposure as exists after development the range of utility of gelatine emulsion would be thereby much extended. In searching for the cause of the decreased solubility of the developed film it was first suggested that it was owing to the presence and action of the sensitive silver salt; but this view must be rejected as untenable, for were it otherwise the undeveloped film would be as difficult of solution as after the operation of development, which is not the case. The dried gelatine pellicle may, perhaps, be less soluble than pure gelatine, though we have not noticed it to be so—at least, certainly not to a greater extent than might be anticipated from the introduction of a large proportion of insoluble matter; while the developed image exhibits the property of resisting a higher temperature to such a degree as to point directly to some action of the developer.

The pyrogallic acid appeared to us to offer the most probable solution of the question; for though, unlike tannin, it produces no precipitate with solution of gelatine, we thought possibly it might be found to exercise a more gradual action, while during development it is impossible to say what effect is produced by the substances arising from its decomposition by the alkali. In order to test the matter we prepared solutions, both aqueous and alcoholic, of gallic, pyrogallic, and tannic acids, in which the gelatine films were immersed as soon as they had set firmly. This, it will be noted, is a variation from the plan adopted by Lieut. Lysaght, who applies the solution to the dried film immediately previous to development; but, whatever difference it may produce in the rapidity and other photographic qualities, it will be obvious that the "hardening" action which we particularly desired to investigate will be similar, if not identical, in either case. The plates were allowed to soak for about three minutes in the solution, then drained, and set away to dry in the usual manner. Whether the removal of the hardening substance previous to drying would influence the result or not we are unable to say.

A plate thus treated with aqueous solution of gallic acid was plunged into a dish of cold water to remove the excess of that substance, and was then transferred to a second dish containing water at a temperature of about 80° F. without any result. The temperature was then gradually raised by the addition of more hot water, when the film commenced to "wrinkle," first at the edges, and then over the whole surface, until when the thermometer registered 100° decided signs of solution commenced to be apparent. A similar plate was exposed and developed with warm pyro. solution, the highest point reached being probably not more than 85°; the development was rapid though regular, with a fair amount of density, but a strong tendency to blistering and wrinkling of the film was evinced. Plates submitted to the action of the alcoholic solution, and otherwise treated in a similar manner, exhibited no noticeable difference in behaviour at this stage, though they were found to dry more quickly than those first mentioned.

Substituting pyrogallic for gallic acid, and proceeding in the same manner, the chief difference was an extension of the limit of temperature at which solution of the film commenced. The unexposed plate entered upon the "wrinkling" stage at about 100°, but withstood solution up to between 115° and 120°. The exposed plate, developed at a temperature of 90°, came out rapidly and vigorously, but, contrary to the previous one, exhibited no tendency to blister. A further experiment unconnected with the end in view proved that plates treated with pyrogallic acid previous to drying may be developed to the first stage with alkali alone, though the whole of the pyro. be removed by lengthened soaking in water. In this case, as in the last, no difference could be detected between the aqueous and alcoholic solutions.

When tannin was employed as the preliminary wash, as might have been anticipated a very marked difference was noticeable in the appearance as well as the behaviour of the films. In the first respect the gelatine appeared to shrink considerably in thickness while in the tannin bath, and when removed was hard and "leathery" to the touch like a piece of insoluble carbon tissue, instead of being tender and easily damaged, as the others were. When dry it presented a much harder surface than ordinary films, considerable force being necessary to scratch it, even with a sharp instrument. When moistened again it suffered little expansion, even when allowed to soak for a much longer time than was given to the other plates, and the developing solution was with difficulty retained upon the plate, owing to the repellent nature of the surface. Solution, properly so called, was impossible, though with water nearly approaching the boiling point blistering occurred similar in description to that experienced in developing a carbon print at too high a temperature.

The development of the exposed plate was performed in the same manner as in the previous cases, but the temperature was raised considerably. The operation occupied a much longer time without, however, any symptoms of under-exposure. We had expected that in point of rapidity the tannin plate would have proved inferior to the others, but purposely gave the same exposure in order to retain uniform conditions; the result, however, is, we think, open to a simple explanation. The lengthened development would ensue from a combination of two causes—the restraining action of the tannin and the impermeable character of the film—while the apparent equality in point of rapidity may be set down to the effect of higher temperature. The quality of the image obtained with the tannin plate was very good, density being obtained without any difficulty with alkaline pyro. alone and without destroying the half-tone. The operation of fixing was somewhat protracted; hence it may be inferred that if such films should come into general use a lengthened washing would be necessary to remove the hypo. from the film in order to ensure stability of the image.

The next experiments consisted in adding gallic and pyrogallic acid to the washed and redissolved emulsion; but, though no action was observable while the mixture was warm and in solution, it was found that after allowing it to solidify it was very difficult to render it perfectly liquid again, and even at the best the result was very unsatisfactory. The effect appeared to be to render gelatine partially insoluble, and even a very high temperature only produced a "lumpy" solution. We therefore forebore the further prosecution of this line of experiment, finding no prospect of any probable utility.

Such is a brief account of our previous experiments. Since the publication of Lieut. Lysaght's researches, we have gone over the same ground as himself, using also gallic acid and tannin in place of pyrogallic acid immediately before development. We can corroborate all that gentleman says in his communication upon the subject, and have only to add that the action of the other substances named is relatively the same as in the experiments we have detailed. With regard to any difference in the effect produced upon the film by the application of the solutions, previous to drying or after, we are inclined to think that it is slightly greater in the latter case, but are not in a position to offer a pronounced opinion upon the point. It appears to us, however, that, *cœteris paribus*, the treatment previous to drying would have the effect of rendering the films less liable to damage from moisture or other causes; and, provided due precautions be taken to keep the temperature of the "hardening" bath sufficiently low and to drain the films properly, no inconvenience and but little extra trouble would be incurred.

In conclusion: we must express an opinion that the idea is one well worth further research, as a means of increasing the utility of the gelatine emulsion, especially in hot climates. It also opens up a new application of the emulsion, of which we shall speak next week.

ON PRINT BURNISHERS.

At the request of several readers we recently undertook to try by experiment the nature of the action of the various descriptions of heated print burnishers which, originally introduced in America, have now been adopted nearly all over the world. The special points we undertook to examine had reference, not to special *makes* of burnishers, but to the principles underlying their various forms of manufacture. These principles, when reduced to simple elements, are found to be of a twofold character, viz., the oblique and direct action of the heated burnisher upon the print.

With regard to the rival patents and inventions which hinge upon the principle of burnishing photographs by making them pass over the surface of a heated polished bar of hard metal, we shall have nothing whatever to say here. American patentees have spoken strongly and fully enough on this subject in our pages to render our doing so again quite unnecessary; and in what we have now to advance we shall quite ignore all patents, and even all special forms by which patent inventions are carried into effect, and confine ourselves to the action of the burnisher upon the print.

We may here state that all the print burnishers we have seen belong to one or other of the two following kinds—that in which the steel (or other hard metallic) burnishing rod is dragged squarely over the print from end to end, or that in which the burnisher is dragged diagonally or from corner to corner, this diagonal action being reciprocatory in its motion.

In conducting our experiments we made use of the particular description of burnisher introduced by the late Mr. William Cleary, whose sudden death we recorded a few months ago. We selected it because, so far as we know, it is the only burnisher extant by which can be obtained, at will, either kind of motion—the diagonal or the direct. Its power of accomplishing this arises from the burnishing rod consisting of a square bar of steel, which, by means of two cams on the rotating axis, is caused to travel endwise, in a reciprocating motion, all the time the print is being dragged over its polished surface.

In carrying out our experiment twenty-four *cartes* of a similar kind were first of all sponged over the surface with an alcholic solution of Castile soap, the strength not much exceeding one grain to the ounce. This application is necessary in order to ensure the burnisher gliding over the face of the picture without tearing up the surface or abrading the film of albumen.

Twelve pictures were burnished by the machine in its normal condition; that is, when having *in situ* the cams by which the reciprocatory motion was imparted to the steel rod. The twelve received precisely the same amount of pressure, but, owing to the removal of one of the cams, the burnishing rod did not move, and the action was of the direct or straightforward character. In both cases the burnishing was carried to the highest pitch possible, and the burnisher was polished with crocus and oil, previous to commencing, in each instance.

A private mark having been punctured upon the backs of the *cartes*, so as to identify them, they were all placed in the hands of an expert in order that he might select the twelve best burnished prints. Now for the result. Nine were selected as being, on the whole, more brilliant and closer in grain than the others; and of these nine six had been burnished by the direct, and three by the reciprocatory, movement of the burnisher. On submitting the twenty-four prints to another expert he declined the attempt to make any separation; "for," said he, "the quality of all is so very nearly alike that any existing differences, real or fancied, may more than likely be owing to accidental circumstances not controlled by the *modus operandi* employed."

The conclusion at which we arrived, after having carefully conducted this trial, was that, while the action of the burnisher imparts an unmistakable degree of smoothness to the print, its particular action is of no consequence.

PHOTOGRAPHY ON TEXTILE FABRICS.

During the outcry for novelty which periodically makes its appearance with each season of dullness of trade, it is somewhat curious that so little attention has been given to what, if properly carried out, could not fail to be a source of attraction and become a popular application of photography, namely, the printing of photographs on

textile fabrics. We daresay most of our readers have seen, or are familiar with, the attempts which have been made in this direction; and, as some of the results are very beautiful and the method is of such extensive application, it is matter for surprise that this department of photographic work has not taken the position to which it is properly entitled.

The various ways in which textile photography could be applied are so self-evident that we need say nothing on that head, except perhaps to suggest that nothing could be more appropriate when making a present of (say) handkerchiefs than a neatly-vignetted bust from a *carte* negative, either of the donor or the recipient, in one corner of each.

We recently had an opportunity of examining some fine examples of pictures of this class; and, under the impression that they were different from anything we had previously seen, and also believing that probably that difference might in some way account for the fact that hitherto such work has not become popular, we bestowed some attention on the matter, and have made a few experiments, the result of which we propose to state.

Textile photography may be divided into two classes—that on silk or satin, which does not require to be subjected to washing, and that on linen, calico, &c., which must be washable. For the former class the published methods answer well enough, and for the present, at least, we do not intend to refer further to such fabrics. With reference to the latter class, if we examine (say) a handkerchief on which a photograph has been printed by one of the ordinary methods, the picture may be found all right, but the part of the material on which it is impressed, and for some distance round the picture, is slightly hard and glossy from the albumen used in the preparation having become insoluble and resisting the action of the washing subsequent to the fixing of the image. Then, however beautiful the image may be, it is mainly in the albumen film, and in a very short time, if subjected to ordinary washing, the whole crumbles away, and leaves only an unsightly stain behind. True, textile photography on such articles should be like ordinary marking ink, and have the image formed of reduced silver, not on or in an adherent film, but in the texture of the material itself. If this can be accomplished, not only will there be an absence of the offensive glossiness and stiffness of a part of the article, but the picture will be as indelible as is ordinary writing with marking ink.

That this was fully accomplished in the specimens to which we have referred there could be no doubt; and, although we have to wait some time for full particulars as to how it was done, we learned sufficient to enable us to make a series of experiments in the desired direction, and to meet with, at least, a very promising amount of success. Our object being more to direct attention to the method, and induce those who have sufficient leisure to work it out, than to give anything like exact formulæ—which, indeed, we have not yet by any means settled for ourselves—we shall merely give an outline of the process as communicated, and as we have practised it with more or less success.

A solution of gelatine is made of such a strength as to become a somewhat firm jelly when cold; and when the temperature has fallen low enough to allow the liquid to become viscid, but not nearly thick, chloride of ammonium to the extent of ten grains to the ounce is to be added. When this is dissolved an exact equivalent of a strong solution of ammonio-nitrate of silver is added by degrees, with rapid but not violent agitation. If the shaking or stirring be too violent there is a tendency to the silver chloride forming in clots; but with a little care, especially if the solution of gelatine be sufficiently viscid, a fine, even emulsion is easily formed. When this is accomplished the article to be printed is immersed in tolerably hot water and well wrung, and while still warm is coated in any convenient way on both sides with the emulsion. If only the corner of a handkerchief, it may be immersed in the emulsion for a few seconds and the superfluous solution removed by drawing it over the edges of the vessel, or it may be laid on a piece of warm glass and the emulsion spread over the part with a warm glass rod; but in any case it must be allowed to soak well into the texture of the material. All this must, of course, be done in the dark room, and the article pinned on a frame or suitable board that it may dry flat and free from creases. The chlorised article will, in this state, keep perfectly white or free from decomposition for at least a week, and only requires fuming with ammonia, in the ordinary way, to be ready for the printing-frame. The printing must be considerably deeper than is required with albumenised paper, as only the reduced silver chloride that has been absorbed into the texture of the fabric remains after the various washings to which the material must be subjected.

After printing the article is passed directly into the toning-bath—which may be any of the solutions of gold in general use—and is then washed in several changes of warm water and fixed in the usual hypo. solution. Washing in a few changes of warm water completes the process, and if it has been carefully managed the result will be such a picture as should, if properly introduced, become very popular with the general public.

This is, as we have said, simply an outline of the process, but it will be sufficient to enable any ordinary photographer to start on the right trail; and we shall be glad to see photography on textile fabrics extensively applied.

To this we append a digest of the directions for effecting the purpose, which we published in our volume for 1866. This we do the more especially as we know that a large body of our readers cannot now have access to that volume. The formula is that of Mr. Meade (see vol. xiii., page 344).

Soak the fabric for one minute in a solution composed as follows:—

Water	2 ounces.
Gelatine	5 grains.
Chloride of sodium	5 ,,

Hang up to dry; then float for half-a-minute on a fifty-grain solution of nitrate of silver. When dry print and tone as for plain paper prints.

From the last paragraph in Mr. H. B. Berkeley's letter in another column we infer that that gentleman has slightly misunderstood the purport of our remarks upon the subject of artificial light in the dark room, but principally that portion relating to the description of glass employed. Mr. Berkeley condemns the turmeric varnish we recommended for producing a non-actinic colour, even when spread upon both sides of the glass. As he is well known as a most careful experimentalist, it is possible that this may arise from his unwillingness to introduce even the most remote risk of uncertainty into his operations; still his remarks have suggested to us a probable direction in which less careful workers may go astray. In an article upon the subject in our number of November 10th we stated that, when working with an artificial light—whether paraffine, gas, or any of the usual forms—it is unnecessary to employ the extremely non-actinic description of glass to shade the flame, the lighter sorts being quite dense enough for the purpose. This is quite true, but at the same time the assertion must be qualified to suit different circumstances. Our remarks were intended to bear mainly upon the light employed in development, and it will be obvious that such a light may be sufficiently non-actinic to allow of a plate, however sensitive, being exposed to its action for a comparatively brief period, while a longer exposure might possibly produce hopeless fog. Mr. Berkeley's indictment of turmeric varnish is based upon the fact that it effectually fogged a gelatine plate "in less than an hour." We think that even half-an-hour is considerably beyond the limit of time usually occupied in development; hence, if nearly an hour be necessary to produce fog, it may be inferred that for purposes of development, even of gelatine plates, the turmeric varnish may be employed with perfect safety. But for other purposes—such, for instance, as the preparation of the plates—it may be found necessary to adopt further means of protecting them from fog during the somewhat lengthened time they are liable to exposure to the light. The most obvious way out of the difficulty is to use a denser glass; but the *quid pro quo* will be a serious, if not inconvenient, loss of illumination. By far the better plan will be to perform only the most important operations, such as coating and sensitising, under the full action of the lamp, the plates being protected during washing and draining by an opaque screen. By this means a good working illumination is secured, without danger of fogging the plates.

MORE LIGHT IN THE STUDIO.

The question of lighting the studio is one of such vital importance to all engaged in photographic portraiture that, at the risk of being charged with overdoing it, I venture to make a few observations on a branch of the light question which is totally distinct from the subject of recent articles in this Journal *On the Light Employed in Photographic Operations*, and which, notwithstanding all that has been written, would appear to be but imperfectly understood by at least some who are engaged in the practice of our art-science.

We are told that, at a meeting of the Photographic Society of France, M. Scotellari sent a communication—listened to with much interest—on a new method of lighting the studio, such method being the exclusion of all but the violet from the rays of light allowed to enter. M. Scotellari proposes to effect the object desired by the use of a violet-tinted varnish, and a Bordeaux chemist asserts that, amongst its advantages, the method of working admits of the exposures being reduced by nearly one-half.

I am unaware whether or not the inventor who has patented the idea claims the use of a violet light, or merely the producing of it by a coloured varnish; but, in either case, if he had been a student of photographic literature he would have known that both have more than once been the subjects of discussion, and that they have again and again been taken up only to be as often laid aside as comparatively worthless. One hardly knows whether more to wonder at the members of a learned society gravely listening with "much interest" to such a communication, or that any man could be found willing to patent such a self-evident fallacy.

It is now well known that the rays of all the various degrees of refrangibility are more or less capable of influencing the sensitive film; but, even if it were true, as at one time supposed, that photographic action was confined to the blue and violet end of the spectrum, a very little consideration must make it quite clear that no increase of those rays can be obtained by cutting off or absorbing the green and red.

But not only can nothing be gained by such a mode of procedure—there is a positive and easily-demonstrated loss from two causes. A small loss arises from the interception of whatever power may lie in the absorbed rays, and a larger loss from the absorption of a portion of the blue and violet rays themselves. It is possible that, if a medium could be found that would give as pure a violet as is produced by the decomposing action of the prism, such a light might act as rapidly, or nearly so, as if it had its proportion of the other rays; but no such medium has yet been found, and, so long as the glasses and varnishes with which we are acquainted are used, we must submit to a loss, in no case small, and varying according to the depth of the tints or shades.

From notes and specimens, the results of numerous experiments made some time ago with glasses and solutions of vegetable colouring matters, I found that the loss of actinism varied from twelve to sixty per cent. In all cases the tints or shades were as nearly as possible adjusted to that of a sheet of flashed blue glass, of such depth that the print of this Journal could be easily read through it when in close contact. Glass of apparently the same shade varied much in the amount of retardation of the actinism, but the solutions varied much more. As a rule, apparently pure blues were much less obstructive than a similar shade of violet; but the very fine blue of the *viola odorata* was a decided exception. Why this is so I am unable to say, but it may in some way arise from the fact that it may readily be separated into a paler blue and a bright red by the addition of acetate of lead.

Successful portraitists are well aware that the best results are obtained by small quantities of light properly directed. It should never be forgotten that where but a little is used it should be of the best quality; and it is simply nonsense to say that, given a volume of ninety degrees—say thirty each of red, green, and blue—will be made more active by the exclusion of the sixty of red and green. If M. Scotellari, or any other experimentalist, will discover a means of altering the refrangibility of the red and green, so as to more nearly assimilate them to the blue, I shall look with satisfaction on the protection of the discovery by a patent, as then, and not till then, shall we get a real increase of action by the sole use of the blue ray.

While on this subject I would direct attention to a method of increasing the available light in some studios that I have repeatedly noticed, but which is not so generally utilised as it deserves. There are many cases in which the light on one side of a studio is of little use, in consequence of the proximity of a dead wall only a few feet in front. The only light which can reach such a studio is that direct from the sky, and is thereby lost. If, however, the rays fall on a ground or rough surface a large quantity will be radiated and become available for photographic work. Such windows, therefore, should be glazed with ground or obscured glass—preferably with the obscured side out. I am acquainted with a laboratory situated in the basement story of a building. This was at one time well lighted in every part; but by-and-by, the wall of a lecture-hall having been built to a considerable height about six feet from the windows of the laboratory, the latter became, in consequence, so dark that gas had to be constantly in use. The windows were obscured on the outside by stippling with kaolin or sulphate of barytes, made into a thin paint with a solution of silicate of potash, and now the room is again well lighted in every part. John Nicol, Ph.D.

NEW EXPERIMENTS IN INTENSIFICATION WITH LEAD.

[A communication to the Photographic Society of Vienna.]

In spite of our method of intensification* having been tried with success in some quarters, we have received repeated communications relating to this or that difficulty against which the experimentalists had to struggle. Accordingly, as we had not met with some of these difficulties in experimenting before the publication of our process, and others we had not expressly referred to, though believing that in our short but comprehensive article the means of removing them was sufficiently indicated, we have felt called upon to supplement the article in question by a more exhaustive discussion of some points, and by submitting our new experiments.

Amongst other things it has been observed that in negatives which, before intensification, appeared clear the finest details were destroyed by fog after the intensification. The question is, then—Was the cause of the fogging in the negative before the intensification, or is it to be sought for in the method of intensification? That is—Would the latter have caused fogging with an absolutely faultless silver bath? This can be answered directly. When properly employed, intensification with lead never causes fog, but only makes the unremarkable and undervalued fogs which the negative had taken on during the development, &c., more evident in consequence of the increase of the density, so that they have a disturbing effect and permit little light to pass through.

In a perfectly-clear negative fog occasioned by the lead never occurs. This is proved by an experiment made by one of us,† in which it is shown that the action of the lead intensifier is purely chemical, and that intensification can only take place where there is silver. If, however, one still wish to intensify with lead a slightly-fogged negative, the lead bath should not be allowed to act with its full strength (we have already remarked that the fixed and washed negative while yet damp may be strengthened very quickly, but if previously dried it becomes slowly denser, and that *à plusieurs reprises*, so that the process may easily be controlled and interrupted at pleasure), or, to make the best of it, a *clearing medium* must be used. The latter may be employed either before or after the intensification with lead. Here we shall only refer to that which is used before the intensification. An excellent medium is the often-recommended iodine, which is best used *before* fixing. A solution of from one to two parts of iodine and three to four parts of iodide of potassium in about one hundred parts of water is allowed to flow equally round and round the plate until the blacks have turned a pure yellow, when it is quickly rinsed and fixed. The finest silver particles, the fog, are first seized by the iodine solution—that is, are transformed into yellow iodide of silver. Should the treatment be continued too long, by degrees the whole picture would be converted into iodide of silver, which in the subsequent fixing would be dissolved. With proper treatment the picture will become clear, but at the same time it will be weakened; still that is of no consequence, as the intensification with lead will make up for it. Cyanide of potassium, or any other of the many clearing methods, will serve the purpose equally well.

Methods for clearing from fog, negatives which have already been intensified with lead, will be given afterwards.

All these methods are but exceptionally required by a foggy negative. A perfectly-clear negative remains so after the intensification with lead, because the silver parts are perfectly opaque. If, with lead intensification, anyone get fog it is a proof that the negative he has in his hands is not a suitable one, and that he is not entitled to call his silver negative free from fog. Moreover, intensification by lead is a remarkable criterion of the original clearness of a negative, and can be used as a test for it. It is not at all difficult, according to known processes, to prepare suitable negatives; and he who, using the lead method of intensification, has to complain of fog should seek for the cause of the fault in the badly-handled

* See The British Journal of Photography, March 3, 1876, page 104.

† See The British Journal of Photography, March 24, 1876, page 140.

negative, and not in the intensification.* We lay stress upon this because we have found that in many celebrated establishments they are not particular enough about these apparently-slight fogs, and in seeking for the origin of such fogs, when they have at last become inconvenient, they set out on a false track.

Clear negatives may also be fogged by badly-executed lead intensification. Hyposulphite of soda converts red prussiate (ferricyanide of potassium) into yellow prussiate (ferrocyanide of potassium†), which then, with nitrate of lead, gives a precipitate of ferrocyanide of lead. If the first, therefore, be still contained in the negative, then the lead bath must cause fog.‖ In the same way cyanide of potassium forms insoluble cyanide of lead‡, so that badly-washed plates fixed with cyanide of potassium become foggy. It is, therefore, well to wash the negative as carefully after fixing as if it were to be varnished and laid away.

Perhaps we at first laid too much stress upon the use of distilled water as washing water, because the spring water at our service was very hard and too rich in chlorides and sulphates. The use of water from high springs containing a minimum of fixed impurities makes distillation quite superfluous.

Acetate of lead (sugar of lead) instead of nitrate in the bath may give rise to fog, as in solution it draws carbonic acid from the air, and the resulting carbonate of lead§ covers the plate equally. This we have already remarked upon when we recommended the nitrate of lead.

It may also be remarked here that a concentrated lead bath has not only the advantage of working more quickly, but is also much more stable than a dilute one, because it is one of the properties of red prussiate to decompose, with the formation of yellow prussiate, much more rapidly in dilute than in concentrated solution.¶

After a negative has lain a few minutes in the lead bath, and has become dense enough, it is thoroughly washed with water. After rinsing it well we should, indeed, let it lie from half-an-hour to two hours in water in order to be certain of having got rid of all traces of the lead bath that might cling to it. It is then finally washed once more, and treated with sulphide of ammonium or potassic chromate, according to one of the methods hereafter given.

Ferrocyanide of silver is certainly not so absolutely insoluble in water as one would suppose from current opinion; for if a white negative intensified with lead be left lying for several days in pure water it will become extraordinarily weak, and its density cannot be restored even by leaving it for days in the lead bath, because there is no longer any metallic silver in the picture to serve as a starting-point for the intensification.

To blacken (sulphurise) the washed, white, lead picture we employ sulphide of ammonium exclusively, as it acts more equally, and penetrates the film more quickly than a solution of liver of sulphur, as this last in dilute solutions is very apt to cause spots, which never show themselves with sulphide of ammonium.

Many photographers have, however, met with a difficulty which is not so easily disposed of as the foregoing. It is the rents which, with many collodions, make their appearance in negatives intensified with lead—sometimes while yet damp after washing, and sometimes while dry. Until a short time ago we never met with this fault, although, having heard of it, we tried various collodions in order to find one in which we might observe the phenomenon. Several photographers also had not observed this drawback, while, in consequence of it, another gave up intensifying with lead.**

Collodion prepared with cellulose cotton, the ether and alcohol contents of which varied, gave films which did not show rents, not even after four per cent. by volume of distilled water was added (the raw collodion was prepared with ninety-five per cent. of alcohol), in order to see whether richness in water was the cause of the rents. If with too great an addition of water the collodion film immediately after the fixing do not show rents caused by the richness in water none will appear after the lead bath. Kleffel's collodion showed itself free from this fault, as did also Ulbricht and Kader's Elizabeth collodion, and Kreidel's, Dr. Heid's, and Moll's. On the contrary, negatives prepared with Herzog's brilliant collodion were uncommonly subject to these rents. The greater number of films showed many rents and cracks when the lead bath was washed off—not, indeed, immediately, but when most of the salts had been washed out, and more frequently when the stream of water was strong and cold than when the washing was done in dishes the water in which was of the same temperature as the room. These negatives were also liable to strip off (especially the chromium and lead-plate negatives); the tendency was much less marked in the sulphur and lead negatives, while those prepared with the other collodions referred to were not. This result seems to be based upon the fact that many collodions, owing to the way in which the cotton is prepared, give friable and easily-torn films, because they cannot keep the deposit together; and the deposited film, being unyielding and brittle, the skin of collodion is rent by the slighest contraction. Generally speaking, collodions rich in cotton are preferable both for our and similar methods of intensification.

It is scarcely necessary to say that these remarks of ours upon the collodions of which the names are mentioned are not intended as conclusive judgments upon them, but are merely offered as examples of the results afforded by them when tested by us.

Another preventive of the rending of the film, which, however, does not always answer, is the albumenising or rubbering of the glass plate, and with the collodions we mentioned first it is quite superfluous; the addition of one per cent. of resin (colophonium) also appears to be useful. But the simplest and most wholly reliable way to get faultless negatives with such collodions as are liable to rents when placed damp in the lead bath immediately after being fixed and washed is to let the negatives become quite dry before being placed in the lead bath. The intensification certainly requires longer time, but after being dried the negatives never tear.

Josef Maria Eder, M.D., and Victor Tóth, *Captain.*

(To be continued.)

* One should not expose and develope too long. The picture, if it be thin enough, should stand out clear and transparent from a dark background.

† *Diehl, Journal fur Pract. Chem.*, lxxix., page 430.

‖ We mention that this remark is also applicable to the Selle's intensificator, because in the technical literature which treats of it the observation is not made.

‡ *Handwörterb, d. Chem.*, ii. Auflage. ii. Bd. 2 Abth. page 52.

§ *Handwörterb, d. Chem.*, ii. Auflage. ii. Bd. 2, Abth, page 91.

¶ See *Behaviour of Aqueous Solutions Exposed to Light.* S. A. Vogel, *Chem. Centralblatt,* 1871, page 114.

** It must be remarked that he also always got rents in his negatives with the simple sulphur intensification, iodine, iodide of potassium, then sulphide of ammonium.

A FEW OF THE LESS KNOWN GOOD DEEDS OF PHOTOGRAPHY.

Artists connected with the various illustrated papers and journals in this and other countries are gradually but surely changing their styles of drawing under an influence which is unrecognised, but which is, undoubtedly, that of photography.

Photographic processes of engraving are now most extensively used, and painters who formerly never made drawings for engravers, on the ground that they had not had the special necessary technical experience or education, now send their monochrome paintings to the photographer to be reproduced on wood in what is called "tint," and a new class of engravers have arisen who, unlike the older members of their profession, can translate "tint" into "line" with a considerable degree of artistic talent and feeling for effect. They are not, consequently, the mere mechanics which the old *facsimile* engravers mostly were, but must, of necessity, have a considerable degree of artistic taste and knowledge.

This has been very prominently visible ever since the *Graphic* entered the field with a richness of colour and force of effect in its wood engravings which entirely put into the shade the old style of engraving and wood drawing. The conventional tameness and sameness of the engravings, with the absence of dash, spirit, and freedom in the drawings common to old wood-engravings as compared with those of more recent execution, may be very forcibly realised by anyone who will take up an old volume of the *Illustrated London News* and compare it either with the *Graphic* or with the former's earlier volumes.

On the other hand, another great change has been effected in the same direction, although less directly by the same agency—photography. We have now an extensive use of photographic-engraving processes whereby the art of the wood engraver is very largely dispensed with. There are two large establishments employing a great number of persons in Farringdon-street, London—those of Messrs. Leitch and Messrs. Dawson—which every week turn out blocks in relief for printing in illustrated books and papers in astonishing numbers; and there are other establishments of a similar kind in a more or less thriving state in other parts of London, to say nothing of the great number of such establishments in America and France.

These, too, have modified the style of draughtsmanship, and no better illustration of the change effected will be found than is supplied in the pages of another illustrated London paper, the *Illustrated Sporting and Dramatic News.* The freedom which the painters have displayed in making "tint" drawings for the engravers is here emulated by the wonderful freedom of "line" treatment adopted by artists drawing with a special view to reproduction by

photography. They are shackled by none of those considerations which hampered the old wood-draughtsman and spoiled his workmanship. They have not to ask themselves—"Will this cut?" or, if it will "cut" (that is to say, suit the engraver's tools and process), "Can it be cut for the price the engraver is to receive for his work?" He has not to please his employer, the engraver, by putting in work which, by being easily cut, will increase the engraver's profits, photography reproducing with no greater ease the simplest than the more elaborate treatment. On the contrary, he is free to study his own reputation only, to introduce any effect he pleases without the slightest reference to engraver or cost of engraving; and the result is that his drawings gradually acquire a freshness and vigour as new in their way as the wonderful force and power of the painter's drawings for wood-engraving are in the other.

The illustrations in our last-named contemporary will fully bear out this statement. They are mostly engravings executed by Messrs. Leitch and Dawson, whose processes of reproduction in relief by photography are the most perfect we have, thanks in the former case to the careful superintendence, taste, and knowledge of Mr. Skerry, and in the latter to the knowledge of Mr. Alfred as a painter and the acquirements of Mr. William Dawson as a master of all the more mechanical elements of success. As drawings they have qualities which have been commended by artists in all parts of the world. But as yet these things are in their infancy. Both in monochrome painting for engraving and in line drawing for photographic engraving there is much to learn and much which is rapidly being learnt.

Photography on wood is a branch of art which for many years past has been assuming greater importance in connection with illustrated literature; but it is surprising to find how few operators there are whose work engravers recognise as really serviceable, and it is more surprising to find how little publishers know of its advantages. I saw, not many months ago, upwards of three hundred pounds' worth of work done by draughtsmen in reproducing a series of old engravings which might have been done by photography with greater perfection at a third of the cost, or less, to say nothing of the additional, and perhaps even greater, saving which might have been made by placing the engravings themselves in the hands of Messrs. Dawson or Leitch for reproduction by photography in relief.

Turning from these phases of my subject I recal the large number of really clever photographers who have failed in perfecting a process of photographic engraving in relief, simply because they did not take the trouble to understand the requirements essential to success. In the first place, a block in relief may be very perfect in itself, very beautiful in a carefully-obtained and single proof, and yet fail utterly from the printer's point of view. The lines may not be sufficiently in relief, or may be too fine to suit the kind of ink used for the paper in which it is printed—or in many other ways be unsuitable for printing. Hence it is that those who have been most successful are gentlemen familiar rather with printing and matters pictorial than with the technical requirements of photography.

But, be that as it may, of this there is no doubt—that illustrated literature has, of late, made giant strides in the way of power and originality, and that, directly and indirectly, these strides are originally due to photography. For these good deeds let us be thankful, and for this record thereof let it pass as a morsel of gossip rather than any more weighty attempt to deal exhaustively with a subject well worthy serious attention in a Journal devoted to the interests of photographic art.

A. H. WALL.

FOREIGN NOTES AND NEWS.

ON THE APPLICATION OF MICROPHOTOGRAPHY TO THE REDUCTION OF BOOKS OF REFERENCE.—ON THE RETURN OF SPECIMENS.

IN an article *On the Utilisation of Microphotography*, in the *Correspondenz*, Herr Mach says that some seventeen years ago, when a student, he communicated a project for the application of microphotography to Herr Auer, then director of the State printing establishment, which was rejected as impracticable. Now, however, having seen some of the microphotographed newspapers which were sent during the siege of Paris, he sees that his idea is practicable, and is encouraged to make it public. It is as follows:—There are numbers of large, costly, and scarce works which will certainly never be republished, and which are used more as books of reference than as works to be read through. Could not these, then, be cheaply multiplied and made generally accessible in the same way as the newspapers mentioned above? The cost of reproducing already-existing originals by microphotography could not be great, since several of the large pages of the original would be simultaneously reproduced, and that by a single operation upon one small sheet; and in the compressed form they would not only be much cheaper but more portable than in the original form. Apparently unaware that the question as regards maps has already been ventilated both in France and England, Herr Mach suggests that a suitable subject for reduction in this manner would be maps, so that a traveller might carry a reduced copy of the general map of Europe, with all the details contained in the largest map, in his waistcoat pocket. He then goes on to propose extending the plan to works illustrative of comparative anatomy, of the geological periods, of the history of architecture either by copying microphotographically from the actual objects or from large plates, and to the dictionaries and other books of reference.

A principal objection would be the difficulty of finding one's place in a microphotographed work; but Herr Mach thinks that difficulty might be surmounted by a series of numbers and signs running down the margin of the sheet. With regard to the reading of these books, he thinks that a binocular magnifying glass with a single object tablet, having two vertical motions, might be constructed so as to answer the purpose. The sheets might either be bound like a book or fastened together like the pictures in a revolving stereoscope. In conclusion, Herr Mach says:—"Naturally, for ordinary cases, microphotography will no more render printing superfluous than railways have made riding, driving, and walking unnecessary; but, for the cases cited above, it seems to me that microphotography as a means of spreading literary helps is as superior to printing as printing is to writing,"

Without going so far as Herr Mach in thinking that a new era is about to dawn upon poor students who have neither the money wherewith to buy large and expensive editions of works of reference, nor the space wherein to stow them when bought, we can see that there are many cases in which reduced editions of these works are desirable, particularly on the score of the cheapness with which they can be produced. But we can scarcely join with him in any very sanguine hope of seeing his desire realised—at least in the case of modern works—because, amongst other reasons, the copyright of these latter has generally not expired, and neither author nor publisher is likely to permit the issue of, or to issue themselves, an extremely cheap microphotographic edition of a book of reference, the plates, &c., of which have been expensively got up, if such a cheap edition be likely to damage the sale of the original large edition; but if such a cheap issue be likely to pay without damaging the original edition we may rest assured that, following the law of supply being regulated by demand, it will be forthcoming.

A correspondent of the *Correspondenz* complains that he has sent finely-finished retouched specimens with a list of his terms to various photographers, a stamped address being enclosed for the return of the specimen picture, and that, in spite of these precautions, he has frequently neither received any reply to his application for work nor has his specimen been returned. In such a case, if, as the complainer in the *Correspondenz* avers, he neither omitted to enclose his own address in full nor stamps for the return of his specimen, and is also certain that he had the correct address of the photographer to whom he sent it, he has certainly a just ground, on the score of culpable carelessness, for the complaint which he brings against the photographer; for he would necessarily sustain a considerable loss of both time and trouble in replacing his vanished specimen. But such cases must be very rare, while, on the other hand, the photographer might as justly complain that he is sometimes pestered by retouchers and others in want of employment sending him unsolicited specimens of their works, which they expect the photographer to return at his own cost—an expectation which some of our professional brethren would not be slow to pronounce unreasonable in these days of close competition and small profits.

SCIENTIFIC JOTTINGS.

THE question of the best antiseptic is one of importance to photographers, more especially since the introduction of the gelatine pellicle process, the various preparations of gelatine, albumen, starch, &c., now required being so liable to become useless through becoming mouldy or otherwise injured by fungoid growth.

Solutions of chemicals, *e.g.*, citric acid, which are so much more handy when dissolved than in bulk, may be preserved, as we have before noted, by boiling, but some foreign substances must be added to the organic preparations we have named. It is not, however, to photographers alone to whom the antiseptics are valuable; their usefulness is universal. In the report of a recent Russian commission we find it stated that carbolic acid is the most efficient means against the development of ammoniacal gas, putrescence, and the development of lower organisms in organic matter under decomposition, and is, therefore, the best anti-

septic; that chloride of lime, permanganate of potash, quickly destroy the lower organisms of putrid liquids. The disinfectants stay the process of putrefraction in a temporary manner only. An article in *Dingler's Journal* speaks disparagingly of permanganate of potash. It does not, it states, destroy *infusoria* for a considerable time. The spores of *mucor* and *pencillium* grow in strong solutions, and *bacteria* are killed by the concentrated solution, but increase when it is of ·1 per cent. strength. Dry chlorine does not act on the lower organisms, while phenol kills all of them it comes in contact with. One very useful agent which might be serviceable to photographers is borax, which possesses very considerable antiseptic properties.

Apropos of this topic, we have recently seen recommended as a new method a proposal for testing the freshness of eggs by means, practically, of their specific gravity. Dissolve 125 grammes of marine salt in a litre of pure water. An egg laid the same day placed in this solution will immediately sink. When a day old it will barely float, and when five or six days old it swims upon the top most buoyantly. If this plan turn out to be really practicable it would be very useful to the albumenisers.

The *Chemical News* has lately published a full report of a paper read before the Manchester Literary and Philosophical Society, by Mr. Pattison Muir, *On the Action of Water and Saline Solutions on Lead.* There are so many cases in which water is required to be stored in lead cisterns that a knowledge of the conditions under which a solvent action may be expected upon the lead, with the result of contaminating the water to an injurious extent for photographic purposes, will be found useful. It would be quite impossible for water used for washing prints to contain sufficient lead to impart colour to the whites in course of time through its sulphurisation. The following are the writer's conclusions :—

1. Nitrates cause water to exert a very marked solvent action upon lead.
2. *Carbonates, sulphates,* and *chlorides* greatly diminish the solvent action of lead upon water.
3. These three salts, *along with nitrates,* greatly decrease or even stop the solvent action exercised by the nitrates when present alone.
4. The amount of lead increases with the length of time during which the water remains in contact with lead.
5. Water charged with carbon dioxide exercises a very marked solvent action upon lead.

No doubt similar conclusions have before been arrived at, but Mr. Muir's paper gives quantitative results, and altogether enables the reader to obtain a more exact and concise view of the matter than any previous data presented. It is worthy of note that the water which has most action upon lead—*i.e.*, that in which nitrates are dissolved—is one which, *à priori,* might be expected to be unsuitable for domestic purposes, as the presence of nitrates is a very certain indication of previous sewage contaminations—such water, nevertheless, being brisk and sparkling, and most pleasant to look at and to taste. The photographer can easily test any suspected water for lead by adding a drop or two of sulphide of ammonium or of sulphuretted hydrogen water.

We have lately alluded to fresh sources of iodine and bromine. There has been rather an amusing passage of arms, upon a little-known though important method of manufacture, between Professor Hoffman and its inventor. By the process in question the sea-weed is first distilled and the iodine extracted from the charcoal—by-products of gas and empyreumatic oil being formed to the extent (from 20,000 cwts. of sea-weed) of 31,000 cubic metres of the former and 12,860 litres of the latter. Professor Hoffman having stated that the process has failed in practice through splitting on the rock of troublesome and costly carriage, the inventor replies that it is and has been in full working order for years, and that he will be happy to supply Dr. Hoffman with one or ten thousand tons !

Dr. Julius Thomson (*Journ. pr. Chem.*) gives interesting details of several gold compounds and their mode of preparation. Anhydrous chloride ($Au\ Cl_3$) he makes rapidly and easily by decomposing the double chloride ($Au\ Cl_3\ Au\ Cl$) with water. The solution should be very concentrated, since dilute solution of gold suffers decomposition through evaporation. Gold chloride is very deliquescent in damp air and very soluble in water, forming a dark red solution. It is also obtained as a by-product, during the preparation of the double chloride, in the form of large reddish-brown, leaf-like crystals. The double chloride, he states, is easily obtained by the action of dry chlorine gas on gold in the spongy state, and best prepared by precipitation with sulphurous acid, boiling with nitric acid, washing, and drying at 170°. He also describes bromides of gold which hitherto have not been practically used in photography ; it might be worth while to essay their action as toning agents.

The bromide of hydrogen and gold, $Au\ Br_4\ H + 5\ H_5\ O$—analogous to the ordinary acid chloride of gold, which is the chloride most familiar to us—he says deserves attention on account of its easy preparation and its stability in air. It is prepared by adding bromine to spongy gold, and, as soon as the reaction is ended, a molecule of hydrogen bromide (*s. g.* 1·38) for each atom of gold, and then bromine till the gold is perfectly dissolved. On standing in a cool place for a time the whole becomes a crystalline mass. The crystals are large, a cicular of a dark cinnabar colour, brittle, and stable in air. At a temperature of 27° this salt melts in its water of crystallisation.

In reference to toning, it is often a subject of annoyance to principals that, even granting some amount of uncertainty in materials, greater irregularity of colour at times prevails than should do. An account of an investigation by Professor Holingren, who has lately examined the whole staff of the Upsala Gefle Railway, suggests a possible cause. He found that out of 206 persons no fewer than eighteen suffered from colour blindness, thus showing that colour blindness is far more rife than is generally supposed.

We conclude this month's "jottings" by some reference to Dr. Karl Hoffmann's contributions to the theory of luminous flames, which will be of special interest to magic-lantern exhibitors. After showing that carbon exists in flames in a solid state—not, as Frankland supposes, in the state of vapour—he finds that gas jets of steatite are decidedly preferable to those of iron, since they consume less gas for an equal strength of light. Metallic jets, in general, notably enfeeble the light. He refers to the results obtained by the Commission of the English Board of Trade, who reported, in opposition to the views of Vogel, that a refrigeration of the gas does not decrease the amount of light, and considers that they must have experimented with a kind of gas poor in hydrocarbons capable of condensation. On the contrary, he finds that if the jet and the outflowing current of gas are both strongly heated the luminous effect is increased to an extraordinary extent.

RECOLLECTIONS OF THE RECENT PHOTOGRAPHIC EXHIBITION.

Having a lively recollection of those discriminating remarks upon former exhibitions with which for the last two or three years your clever correspondent, "A Visitor," has favoured us, it is with a considerable amount of diffidence that I have ventured to place the following notes made during a visit to Pall Mall before your readers. But as "A Visitor's" usual contribution is this year absent from your pages, I hope he will forgive me for poaching on his preserves.

That the late exhibition was a miserable failure can, I think, hardly be denied if we go to the trouble of analysing a few figures. Thus out of 352 pictures *three* exhibitors sent between them *one-fifth* of the entire collection, while *seven* contributed about *one-fourth.* Facts like these speak for themselves. But even this might have been a matter for congratulation had these large contributions by single individuals been of unusual merit. Such, unfortunately, was not the case, the majority being of the most commonplace description ; indeed, the impression left on one's mind is that there has been a decided retrogression from last year. Very few of the pictures bore evidence of having been executed specially with a view to the annual display, and to show the capabilities of the art; and, judging from their specimens, the profession appear to look upon it simply as an additional means of advertising.

Some of them, I know, would reply "that they cannot spare the time which the higher walks of photography demand for their successful cultivation; it would not 'pay.'" I would answer—"Then, for goodness sake ! don't send your usual show-case productions to the exhibition of the Photographic Society, which is supposed to consist of something more than ordinary 'commercial work.'"

The landscape work was noticeable for a general lack of contrast. One would almost imagine that there had been a sort of tacit understanding amongst the various exhibitors to keep sunshine out of their pictures. In fact, here, as in portraiture, we have gone from one extreme to the other; for, as in the former there is a general want of relief, in the latter we have everywhere violent and unnatural attempts at lighting in opposition to all received art-canons, and the results, as a matter of course, were inartistic and vulgar.

It will be seen that the time-honoured names of Blanchard, Earl, Heath, Wilson, Robinson, and many others of note were absent. A great responsibility rests upon those who, for the sake of getting an extra month or so of work which, they say, "pays"—but, in other words, work that is executed with the least amount of trouble—abandon the more important work which we have seen they are so capable of producing. One of the gentlemen mentioned above has produced work this season equal to anything he has ever done, and one may hope that the ridiculously early period at which the exhibition was opened was the chief cause of his works being absent.

Taking the pictures in nearly numerical order, the first that attracted attention was No. 3, *A Rapid in Glen Druid, County Dublin,* by T. M. Brownrigg. This picture was very soft and artistic, the water being capitally rendered.

Next to this was No. 10, *Tangier and Tetuan,* by J. H. Manns. The figures in this frame were very finely posed, and deserved to have stood alone; as it was, the views which surrounded them tended to distract attention from them.

No. 13, *A Giant Ash,* by J. Milman Brown. This picture was not well lighted. That the view had been taken during sunshine is evident

from the shadows which strike across the middle distance. Had it not been for these one might have imagined that a thick November fog was coming on. The "giant ash" was useful as affording a shade for the photographer's van, which, of course, forms a prominent object whenever possible.

No. 16, *High Rocks, Cheddar Cliffs*, by F. T. Palmer, and No. 17, *Cascade at Triege*, by the same, were rather disappointing, neither of these exhibits being up to this gentleman's standard of last year.

No. 25, *On the River Wandle*, by A. and J. Boole, was much too dull and heavy in tone; otherwise it was a fine composition.

No. 27, *A Navy Gang*, by S. G. Payne. The title was, I presume, a misprint for a *Navvy Gang*. If photographers are sometimes obliged to attempt subjects such as these it would be better if they did not exhibit them, unless some effort had been made to pose the figures. In these pictures, of which there were three, the "navvies" are in each case intently staring at the photographer, which one need scarcely add is *not* conducive to artistic effect.

No. 31, *On the Avon*, by H. Whitfield, was a "bit" that an artist loves very feelingly rendered. In this we have none of the "flat" effect before mentioned. The same gentleman had also another contribution entitled *A Worcestershire Cottage*, but it was skied out of all reach. But here again the artist was not at his best, for we have in our mind's eye *A Woodland Lane* and *A Summer Afternoon* in last year's exhibition.

No. 32, *A Country Cottage*, by J. D. Radcliffe. A better title for this tiny production would have been *Going on an Errand*. This picture was beautifully soft and artistic. Two little girls apparently setting out from home, one bearing a basket on her arm. The attitude of the figures most natural and pleasing.

No. 34, *Falling Leaves*, by J. M. Brown. Fully illustrates its title; one instinctively buttons up one's coat when looking on this picture.

No. 35, *The Cobbler's Palace*, by the Royal Engineers. Is one to understand that *all* the Royal Engineers had a hand in producing this? If so, it is a pity that some one of them did not point out the fact that the tilting of the camera would effectually mar an otherwise fine subject.

No. 37, *Wells Cathedral—West Front*, by W. Bedford, and No. 60, *Carnarvon Castle, from the Shore*, by the same, shows that the mantle of the father has fallen upon the son. The tone of these pictures was exquisite, the composition perfect; indeed they exhibit all the delicate "finish" associated with the name of Bedford.

No. 59, *The River Taff*, by Robert Crawshay, would have been very satisfactory had a little sunshine been present.

No. 90, *The Bridge of No Size (Sighs)*, by the Royal Engineers, was a very charming subject finely rendered, but wanting a little more brilliancy and life. It would have been further improved had the figure been introduced in the proper place.

No. 109, *Master Trollope*, by R. Slingsby, Clearly the work of a master hand.

No. 119, *Yes or No*, by J. M. Young; a composition from fifteen negatives. Looking at this production one was not a little puzzled to find out where the fifteen negatives had been employed. No. 129, *Disappointment*, by the same. Here we have the same young lady who figures in *Yes or No*, which at once suggests the idea that it is she who has "popped the question" and received the answer which occasions the "disappointment." The work of this artist was very unequal, for in No. 130, the portrait of *Mrs. Cornwallis West, à la* Gainsborough, he had quite caught the style of that master.

No. 142, *On the Rink*, by W. and A. H. Fry. Noticed only to be condemned for its vulgarity.

No. 148, *Instantaneous Portraits of Children*, by R. Faulkner and Co., exhibits pictorial charms more exquisite, if possible, than usual; but Mr. Faulkner's work is above criticism.

No. 178, *Checkmated*, by J. Chaffin and Sons. Two young ladies playing at chess, a third looking on. The artists, in this instance, have just failed in producing a perfect picture. The young lady on the left, who it may be presumed has checkmated the lady opposite, is looking *out* of the picture, which destroys the unity of the composition. Had her attention been concentrated on her opponent or on the game the result would have been perfection; for the posing of the other figures, the accessories, and the consciousness of defeat on the face of the lady "checkmated," are beyond praise. This was one of the best pictures in the room.

No. 185, *The Finishing Touch*, by George Nesbitt. In this picture a maid was putting "the finishing touch" to a lady's hair. Photography and pose alike very good; but, pray, what business has a gentleman in a lady's dressing-room? His presence somewhere is betrayed by the fact of his profile appearing in one side of the mirror.

No. 205, *Below the Miners' Bridge, Bettwys-y-Coed*, by B. Wyles and Co. It was a refreshing change to come upon a bit of landscape work on this side of the room, and such work as this. Although the tone a little heavy, it was a very satisfactory composition.

No. 218, *Wells Cathedral, from the Tor Hill*, by W. Bedford. An exquisitely-delicate picture, full of light and atmosphere.

No. 219, *Kate*, by J. Chaffin and Sons. These gentlemen prove themselves artists of no mean order; the only fault we can find with this picture is that the lady's Rubens' hat is a trifle too small for her.

I had forgotten to mention No. 191, *The Trio*, by the same artists, which was, perhaps, the most perfect "all-round" picture exhibited.

No. 228, *Bits in Russian Lapland*, by W. J. A. Grant. One of these was *A Lapp Hut*, and sitting at the hut door was the artist himself. In *Tents in Lapland* the tents seem much the same as those in England. We have a right to expect more important things from Mr. Grant than the pictures he exhibited this year.

No. 234, *Game and Fruit*, by S. G. Payne. A picture very well executed, but it would have been better had the fruit not been *quite* so methodically arranged.

No. 242, *A Quiet Afternoon*, by Colonel Stuart Wortley. I am inclined to think that subjects such as this, "cloud and sea," on such a scale are, in the present state of photographic knowledge, a mistake. There always appears to be a want of *day*light about them. Colonel Wortley was much stronger in his *Carnarvon Castle* and *A Hill Side* of two or three years back.

No. 259, *Curvy-na-Creik, Island of Skye*, by Reuben Mitchell. This gentleman evidently knows what is necessary to constitute a fine picture. The wild, desolate appearance of the mountain was truly sublime. The photography, too, was excellent.

No. 264, *Grange, Borrowdale*, by W. Ferguson. An admirable study of light and shade. The artist was fortunate in catching and successfully rendering a very beautiful effect.

No. 278, *Evening Prayer*, by Adam Diston. A perfect gem in photography. The artist had taken infinite pains to have all the details of his composition in complete harmony. The old-fashioned chest of drawers in one corner, the clothes hung carelessly across the chair, the washstand, &c., all told their story in a manner that has seldom been equalled. It was a picture in every sense of the word.

No. 287, *An Old Farmhouse*, by W. Bedford. Here we had a glorious old weather-beaten, time-worn cottage fast falling to decay—a type that under the model (?) farming system is rapidly being improved off the face of the earth; but such a *facile princeps* as Mr. Bedford ought to have broken up the long vista of lane by an object of some kind.

Nos. 299, 301, 303, and 305, *Academy Portraits*—"Art," "Masonry," "Drama," &c. As little as possible of this sort of thing, if you please, Mr. Brookes.

No. 306, *Studies from Life*, by W. Cobb. The hangers served the artist very shabbily. This frame was so badly hung that one could not readily distinguish the contents, but it appeared to contain some very clever little studies.

No. 322, *The Woodland Lane*, by Capt. W. Abney, was a delightfully sunny "bit."

In drawing these remarks on the exhibition to a close I would just venture to throw out a hint to the Amateur Photographic Association, viz., that *they* should get together a display next year. They ought, by this time, to have ample resources for a thing of the kind, and, being confined to amateur work, would do away with the "shoppy" character of which the present exhibitions more or less unfortunately partake. There is no reason why the members of the Association should hide their light (if they have any) under a bushel.

AN OCCASIONAL CONTRIBUTOR.

Our Editorial Table.

TRADE CATALOGUES. GEORGE MASON & Co., Glasgow.

BEFORE us are three catalogues issued in connection with a business having very extensive ramifications, a very good idea of which is imparted by a glance at these catalogues, two of them containing upwards of a hundred and twenty pages. The catalogue of chemical apparatus, which contains no fewer than 294 engravings, illustrating the various articles described therein, is very rich in its suggestiveness; bottles, retorts, beakers, precipitating glasses, &c., &c., of every form being scattered throughout its pages.

The photographic catalogue is, of course, confined to apparatus, chemicals, and appliances connected with the photographic art. It contains over a hundred diagrams, or, to speak more correctly, *engravings*, for many of these are excellent examples of the engraver's art, especially those which illustrate designs in studio furniture and accessories, much of the latter being most elegant without being over ornate. In this catalogue we find several pages devoted to the practice of our art, among these practical matters being an article on carbon printing, which, from Mr. Mason's practical acquaintance with this subject, is, we need scarcely say, of a most practical and reliable character.

The third *brochure* is an illustrated catalogue of magic lanterns, slides, optical goods, magical and conjuring toys. Like the others, this catalogue is replete with matters of interest to those who either possess or have any intention of possessing a lantern. Numerous very attractive slides are to be found in the list of transparencies, many of which, we bserve, are executed by the well-known Mr. G. W. Wilson, of Aberdeen.

MAGIC-LANTERN DISSOLVING-VIEW PAINTING.
By CHARLES MIDDLETON.
London: BRODIE AND MIDDLETON.

IN this manual, which is copiously illustrated by coloured lithographs, Mr. Middleton gives a progressive course of lessons in the painting of transparencies, from the plain outline to the finished picture. One chapter is devoted specially to the painting of photographic transparencies. The directions are clear and concise.

SKETCH OF GEORGE DAWSON.

THIS "sketch" is a reprint, in pamphlet form, of an article which appeared in the *Birmingham Daily Post* of December 1st, and is enriched by an excellent portrait of the subject of the sketch, from a negative by Mr. H. J. Whitlock, of Birmingham. This portrait is printed in "permanent" ink, by one of the mechanical processes, the value of which is now so well recognised. The Mr. George Dawson of whom this "sketch" is written was not the gentleman of the same name who for so many years has been connected with photography, but was the eminent lecturer, and pastor of "The Church of the Saviour' in Birmingham. The portrait is valuable as an excellent likeness, and is admirably printed.

Meetings of Societies.

AMATEUR PHOTOGRAPHIC ASSOCIATION.

A COUNCIL meeting of the above Association was held on the 23rd ult.,—James Glaisher, Esq., F.R.S, in the chair.

The SECRETARY stated that he had received a letter from Sir Antonio Brady, and a telegram from Mr. Howard, regretting that they were unavoidably prevented attending the meeting.

The minutes of the last meeting having been read and confirmed, the following members were elected:—Joseph Dell, Esq.; T. L. Thompson, Esq.; and Mrs. Deeble.

The Secretary then laid before the Council the prizes which had been awarded at the annual meeting, namely:—A large, elegantly-chased silver goblet for Dr. T. Cooke, M.A., &c.; a silver goblet for R. Murray, Esq.; a large volume of photographs, by Mr. Stephen Thompson, entitled *Chefs-d'œuvre of Art and Masterpieces of Engraving*, for F. Beasley, Esq.; a ditto for R. O. Milne, Esq.; an oil painting in frame for T. Brownrigg, Esq.; a silver goblet for W. S. Hobson, Esq.; a ditto for J. McAndrew, Esq.; a large album, elegantly bound in morocco, for Dr. T. Cooke, M.A., &c.; an oil painting in frame for F. G. Lloyd, Esq.; an oil painting in frame for F. S. Schwabe, Esq.; also, an oil painting in frame for J. H. Ritchie, Esq.

It was proposed by Mr. Sopwith, and decided by the meeting, that owing to the late additions to the Council the Secretary should have a new form of honourable mention prepared.

A. J. MELHUISH, *Hon. Sec.*

LIVERPOOL AMATEUR PHOTOGRAPHIC ASSOCIATION.

THE annual meeting of this Association was held on Thursday, the 30th ult., at the Free Library, William Brown-street,—the President, Mr. W. Atkins, in the chair.

The minutes of the previous meeting were read and passed. The Secretary then read the following

ANNUAL REPORT.

OUR Association has completed its thirteenth year, without showing any falling-off in its prosperity.

During the past year few papers have been read, but the interest of the meetings has been sustained by short descriptions and examples of work produced by a variety of processes, which have been experimented upon by different members.

It is unfortunate that we have not more facilities for giving practical illustrations of the methods of working at our evening meetings, as, whenever such demonstrations are announced, much larger attendances of the members has been the result.

It is satisfactory to see that the members, instead of, as formerly, confining themselves to one process, are experimenting and working many of the various processes suitable for outdoor photography, so that we have now a better opportunity of seeing, and exchanging opinions upon, examples of the different descriptions of dry-plate negatives that can be produced.

The wish that the presentation print should be produced from negatives taken by one of our own members has been met by the kindness of Mr. O. R. Green, who took great trouble to produce some negatives worthy of the object. The result has been that for this and last year each member has been presented with an autotype enlargement of a value exceeding the yearly subscription.

The changing of the night of meeting has proved inconvenient only to a few members.

The gelatine process has been very prominently brought forward by the Rev. H. J. Palmer, who spares no trouble in showing the details of its working.

Papers have been read by the Rev. H. J. Palmer and Mr. W. H. Kirkby, and descriptions and illustrations have been given, by different members, of the wet emulsion, burnt-in enamels, carbon transparencies, and other processes.

Trials have been made of different lamps suitable for the lantern, and many interesting cameras and other apparatus used in our art have been exhibited.

Our album has also received several contributions, and a collection of lantern slides for the use of the members is now being prepared.

Notwithstanding the heavy expenditure incurred for the presentation prints, our Treasurer is able to show a very satisfactory balance.

The Treasurer read his report, stating that there was a good balance in hand after paying all expenses.

The under-mentioned officers were then elected for the year 1877:—*President:* Rev. H. J. Palmer.—*Vice-Presidents:* A. Tyrer and H. A. Wharmby.—*Treasurer:* A. Tyrer.—*Hon. Secretary:* William Murray. —*Council:* W. Atkins, T. Clarke, E. P. Houghton, W. H. Kirkby, W. M. Pendlebury, E. Phipps, Rev. J. D. Riley, E. Roberts, W. B. Roberts, L. W. Weber, W. H. Wilson, and E. Twigge.

Laws IX. and X. were altered to—"The ordinary and annual meeting shall be held on the last Thursday in the month"—instead of "the last Tuesday," &c.

A vote of thanks was passed to the Library and Museum Committee of the Corporation for the use of the room in the Free Library.

The Rev. H. J. Palmer exhibited some specimens of retouched negatives, and some sensitised paper for enlargements.

Some discussion took place on the manner of producing certain effects with the sciopticon, during which,

The SECRETARY stated that Mr. Forrest advised thinner glass to be used at each end of the lamp than was generally supplied with it. Mr. Forrest also recommended that the glasses should be tempered by placing them in cold water and boiling them, allowing them to gradually cool; there would then be less risk of breakage from the heat of the lamp.

The President and Mr. Knott then exhibited some transparencies by the aid of both the old and new form of sciopticon, to give the members an opportunity of comparing the merits of each.

The meeting was then adjourned until the last Thursday in January.

Correspondence.

DECEMBER MEETING OF THE PHOTOGRAPHIC SOCIETY OF FRANCE.—SATURATION OF BATH BY IODIDE OF SILVER.—MALLEABLE SPUN GLASS AS A FILTER.—NEGATIVES AND PROOFS FROM EMULSION PLATES.—CHROMOPHOTOGRAPHY, &c., BY M. ROUSSELON.—M. DUCOS DU HURON'S PROCESS.—A NEW AERO-HYDROSTATIC MACHINE.

THE monthly meeting of the Photographic Society of France took place on Friday the 1st inst.,—M. Pelligot in the chair.

A communication was read on the cause of pinholes, which the writer attributed to crystals of iodide of silver forming on the surface of the film. Divergence of opinion exists as to whether the crystals be formed of iodide or nitrite of silver; but, whether of the one or the other, no inconvenience arises when the plates are intended for the dry process, as a rapid washing will eliminate all the crystals. What is the reason of these crystals forming in the bath? may be asked; and how can they be prevented? The fault may, in a great measure, be traced (if the bath be acid) to the gun-cotton employed; the texture of this product being too fine cannot carry the salts employed; the iodide is dissolved out, and the bath soon becomes saturated; upon the least lowering of the temperature or weakening of the bath through the sensitising of a few plates (the alcohol and ether facilitating the operation), crystals begin to form immediately the plate is dipped. In order to prevent a bath acting in this manner, never over-salt the collodion. After the day's work return the bath to its bottle and add distilled water, which will turn the bath of a creamy, yellowish colour; filter, and add nitrate of silver to bring it to its former strength. The bath will now work well. If the bath be alkaline and contain organic matter it is probable that the crystals formed are those of nitrite of silver, soluble in an excess of nitrate of silver; but when the strength of the bath diminishes, from some cause or other, immediately the crystals are deposited, and, being insensitive to light, constitute the most fertile source of pinholes. To cure the bath add distilled water as in the first instance, and after filtration crystallised nitrate of silver with one or two drops of nitric acid.

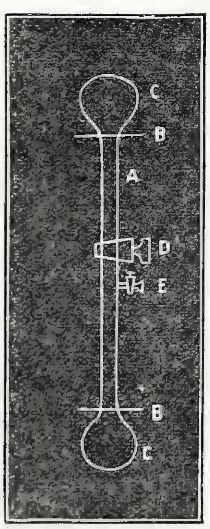
A kind of malleable spun glass was proposed for the filtration of acids, &c., which it is said will advantageously replace amianth for that purpose.

M. Chardon presented some very fine proofs taken on emulsion dry plates prepared by himself. The proofs were very fine; the half-tones came out well. The negatives had the appearance of a wet plate.

M. Rousselon presented the Society with a very fine collection of proofs, being the reproduction of pictures in the late "*Salon.*" This gentleman laid before the Society a specimen by a photolithographic process which he has been studying during a very long period; it is now an accomplished fact that blocks obtained by photography giving the half-tones can be inserted with ordinary printing type* and printed with success. M. Rousselon also described to the Society a new system of chromophotography, it being only, in point of fact, a combination of colours and Woodburytype. Some time back Mr. Woodbury presented—I believe to the South London Photographic Society—a photograph in colours obtained by printing a few plain tints on paper from stone, and covering them with a Woodburytype gelatinous pellicle, through which the colours would harmonise, the different thicknesses of the gelatine forming the shades, &c. This system was very ingenious, but a loss of time was occasioned by being obliged to print from six stones if half-a-dozen colours were required. A gentleman at Hamburgh, said M. Rousselon, had the idea to make a kind of mixture of each colour. These different colours are then placed side by side in such a manner that the colours form the same design as if they had been printed by the lithographic process; or perhaps it can be better understood if I say the colours are placed close to each other in the same manner as a schoolboy would arrange the counties together in the puzzle map of England. The composition employed is soluble when hot and hard when cold, so that if a piece of paper be laid flat on the coloured composition and a hot roller passed over it all the colours will be tinted upon the paper. As the composition is of a certain thickness hundreds, and even thousands, can be printed from the same block of colours. On this plain, tinted paper the Woodburytype pellicle is attached; the whole is then mounted, and is now ready for sale.

M. Klerjot made an experimental demonstration of the heliographic process of M. Ducos du Huron. The three coloured pellicles—yellow, blue, and red—were superposed one above the other, and so formed a very harmonious picture of a bouquet of flowers. Whether this process will render service to the photographic art time will show; at present it is only a very interesting experimental process for the laboratory.

Permit me to depart for once from my usual practice of writing upon strictly photographic topics, and to describe something of a non-photographic nature, but which, I believe, will prove interesting to many readers. M. Ch. Boutet has informed the public that he has discovered a new power, and has invented a machine, which will do away with steam-power altogether. A new aëro-hydrostatic engine is being constructed which, the inventor alleges, will require little or no expense in the production of power.



A, iron tube. B B, iron discs. C C, india-rubber balls. D, communication tap. E, air-cock or tap.

Last Wednesday week I received an invitation to attend a lecture in the company of several *savants*, engineers and others, whom M. Boutet had brought together with the view of making his invention public. I went to the place of meeting prejudiced against his invention, and determined to criticise and controvert his assertions if not properly proved and demonstrated. I left, if not completely convinced, at least astonished at the results he was able to secure.

M. Boutet commenced his lecture with a history of hydrostatics from a very remote period up to the present day. He explained the Archimedean law of immersed bodies, Pascal's principles of the transmission of pressure, and the theory of Mariotte upon the elasticity of air and gas. After having given his audience a long explanation upon these subjects he described the law of Mariotte upon the compressibility of air, &c. He concluded by affirming that the pressure of water upon air ought to furnish the elements of a natural and simple machine of unlimited power and strength.

In the centre of the lecture-room was a large tank of water about a yard and a-half deep. M. Boutet took a two-inch tube, and, as nearly as I could guess, about a yard and a-quarter long; an iron disc was brazed to each end, to which were, moreover, solidly attached two india-rubber balls. The communication between the two balls was stopped by means of a cock; another small cock was placed in the tube to facilitate the admission of air into the ball or balls. (See diagram.) M. Boutet took the apparatus and, after having pressed all the air out of the top ball, turned the tap D; he then blew into the air-tap, in order to inflate the lower ball; the air-cock was then closed, and the apparatus plunged into the water tank, the ball full of air being foremost.

The inventor now drew attention to the fact that very little force was required to plunge the ball full of air to the bottom of the tank; this force, he said, could be calculated at ten pounds. A piece of board was now laid upon the empty ball, and several forty-pound weights were placed upon it. M. Boutet then turned the communication cock D, and immediately the india-rubber ball was filled with air and lifted all the weights which had been laid upon the board. It was evident that as only ten pounds were required to push the apparatus into the tank of water—and by that simple action a force of 160 pounds was obtained—a gain of 120 pounds, therefore, was secured. It is upon this simple experiment that M. Boutet has based his idea of a new machine.

It would take more space than I can claim to explain all the experiments which were made in my presence. I hope, nevertheless, that my readers will be able to judge from the above in what manner the author of the project intends to avail himself of this force to construct an engine of twenty-horse power, as he proposes to do for the Exhibition of 1878.

It is to be made as a double-acting engine by placing an axis in the centre of two tubes as described above. The force obtained will be made to act direct upon two cranks, and from thence to a fly-wheel. All the power obtained will thus be employed, save a small loss in turning the tube bearing the air-ball upon its axis, which, as was said before, required a force of ten pounds. This is nothing compared with the results obtained, viz., a machine which costs nothing but the price of its construction, which is so simple that the wear and tear even is greatly diminished—an engine, in short, which can be applied without danger of explosions, &c., to every trade requiring a propelling force. Such is the invention now brought to light, and my reader s can judge of its importance. This hydraulic force is not new; it was kn own long ago, but had never found an application. Simple things too often escape observation. This discovery—so simple, yet so wonderful—cannot be appreciated without its application being witnessed.

M. Peaud, an engineer, has calculated that if a balloon containing a cubic yard of air were plunged into a tank five yards deep a force of forty-two horse power could be obtained. A great number of engineers are of opinion that M. Boutet has found means to employ an unlimited force which can be applied in a simple, easy, and rational manner.

3, *Place Bréda, Paris, Dec.* 4, 1876. E. STEBBING, *Prof.*

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To the EDITORS.

GENTLEMEN,—I have duly noted the Editorial remarks appended to my article in last week's number of THE BRITISH JOURNAL OF PHOTOGRAPHY under the above heading; but I confess they have not altered my opinion upon the subject that I therein expressed.

I may first disclaim the imputation that I condemn *all* copies of photographs as necessarily worthless, inasmuch as I alluded to the possibility of making from even a half-faded *carte*, or an indifferent glass positive, a work of art such as might compare with those produced nowadays.

With the specimen referred to as having been produced by M. Lambert I am perfectly familiar, having seen it in the course of its production. The print was certainly excellent and was "untouched," but the negative from which it was produced was manipulated by M. Lambert in his peculiar manner and with the marvellous skill for which that gentleman is so justly celebrated. But this by the way.

The object of my communication was to show that copyright in a photograph is not necessarily vested in the person for or on whose behalf the same should have been executed, *unless certain formalities prescribed by the Act of* 1862 *should have been gone through*, without which, though he might, and would be, morally entitled to it, the protection afforded by that Act for the prevention and punishment of those who infringed it would be lost.

The Act, properly enough, was designed to ensure that the person by whose request or for whom a photograph (or painting) should be made or executed should have the copyright secured to him; but as he would not be the "author" of such photograph (or painting) he would not have the *status* to enable him to register himself as the owner of such copyright, which is expressly reserved by the statute to the "author or his assigns." True the Act says that the copyright in a work executed for or on behalf of another shall not be *retained* by the author; but a thing

* Our French friends may not, perhaps, be aware that this has long been *un fait accompli*, illustrations of this method of printing having been given in our own pages some time ago.

cannot be "retained" by any one who has not first been *possessed* of it; and I imagine that in these cases it is *compulsory* upon the author to assign the copyright to the party giving the order, who would *then*, as the "assignee of such author," be entitled to register as the proprietor.

Suppose we take an example:—A. B., a British subject, purchases in the Paris *Salon* a painting by Gerome, with a view to publish copies of it in one form or another—any other name will do as well. Gerome is not a "British subject, and does not reside within the dominions of the crown," and therefore the picture so bought is not copyright in this country. If A. B. decides upon engraving the picture his engraving will be protected by the old Act relating to engraving, as was the case with Mr. Gambart, who was successful in his action for the copying of the engraving from Rosa Bonheur's *Horse Fair*, in the picture of which there was no copyright.

If, however, A. B. determines to publish photographs of his pictures, how is he to secure these photographs from being copied with impunity, to his detriment? In placing his pictures in the hands of the photographer he will stipulate in writing that the copyright in it shall be reserved to himself, and then, as the assignee of producer or author, he is in a position to claim to be registered as the owner of the copyright in the photograph. Of course, if he parts with the possession of the original picture his security is lost, as there being no copyright in the thing itself others would be entitled to photograph it; but as long as this is kept out of the question his photographs are secure from being copied without his permission.—I am, yours, &c., J. A. SPENCER.

December 4, 1876.

To the EDITORS.

GENTLEMEN,—Fog seems to haunt the photographer both *in* and *out* of his studio, but in each case it is generally amenable to remedy, and copyright would seem to be no exception. Your append to the letter on this subject in your last number shortly hits the point.

The Act of 1862, by its first section, vests the copyright of a photograph and the negative in the author of it, except in certain cases laid down in the proviso; that is to say, Brown, the photographer, who makes a photograph is, unless he come within the exceptions of the proviso, the owner of the copyright. Now, what says the proviso? It has reference to two distinct matters. The one is the sale of a negative, and the other a commissioned photograph. In the first case—that is, the sale of a negative—Brown is not to retain the copyright, as he otherwise as author would have done, unless the purchaser of the negative (the vendee) signs an agreement to that effect; and the purchaser is not to have the copyright unless Brown signs an agreement to that effect.

Next, as to a commissioned photograph. Brown, at the request of Jones, for a valuable consideration, takes a negative of Jones, his wife, baby, house, garden, &c., and supplies a print. In this case the copyright, under the proviso, belongs to Jones—the person on whose behalf Brown takes the negative. Jones is not a vendee or assignee of the negative in this case. He is the person on whose behalf it has been made, and as such is the owner of the copyright. Should, however, Brown desire to keep the copyright in the negative which is already his, he must take from Jones a writing to that effect. The latter portion of the proviso has nothing to do with this case.

Whoever has the copyright has a right to do what he pleases with it, and may have his photograph copied in any way and by any person he pleases. It would be a contradiction in terms if it were otherwise.—I am, yours. &c., P. LE NEVE FOSTER.

December 5, 1876.

GELATINE EMULSIONS.

To the EDITORS.

GENTLEMEN,—Since I wrote the account of a late experience with gelatine emulsion I have tried a nearly similar experiment with an emulsion made with Kennett's pellicle, the only difference being that the emulsion was first diluted with an equal quantity of water and then with an equal quantity of methylated spirit, so that I suppose the emulsion contained gelatine at five grains to the ounce instead of ten grains, which my own emulsion did.

I enter thus into (as it would seem) rather minute particulars because the result was not the same as before on adding the methylated spirit. In the present case all seemed to go well till the spirituous emulsion became cold, when a slight precipitate of gelatine was apparent, as proved by its gelatinous appearance when touched with the point of a knife. How to account for the precipitation of gelatine I do not know, as the solution contained even less than before. Warming seemed to put the emulsion right again.

Silver nitrate was then added in the proportion of about a quarter of a grain to the ounce of this diluted emulsion. This caused a precipitation of bromide, not of gelatine, as proved by pouring out a little of the fluid on a glass plate. On standing and becoming colder the precipitate would only leave the bottom of the bottle after long and vigorous shaking, the gelatine being still in solution. [See lines 2-7 at the top of page 557.] It appears probable that I was mistaken as to the "cone" being gelatinous, as somewhat the same effect was noticed in the present case. Warming the bottle made the precipitate somewhat finer. In about one hour after adding the silver I added as nearly as possible an equivalent quantity of ammonium bromide, when the emulsion immediately became, as in the former case, perfectly fine.

On cooling, the bromide was again precipitated to the bottom of the bottle, covered by gelatine, which appeared "stringy" on shaking. The bromide could not be induced to leave the bottom of the bottle. It thus appears that Kennett's pellicle will not bear the addition of a large quantity of spirit—perhaps on account of the peculiar nature of the gelatine. The gelatine I used was Nelson's "opaque."

Lastly: two drachms of water were added to the one ounce of emulsion, which greatly improved the appearance. The emulsion was then poured out to allow the spirit to evaporate, and it now appears in good order again. I tried the sensitiveness of this emulsion when it contained the spirit, and it was the same as before treated with silver—I could not perceive any difference in the results.

It may be asked—What is the use of these experiments? To this I would say that, having noticed a peculiar effect produced in an emulsion prepared by myself, I naturally wished to know whether that effect was to be wrought on other gelatine emulsions by the same means.

[In my communication at page 557, for "purer," at the bottom of that page, *read* "finer."]

With reference to the change of colour you noticed in a plate prepared with the ammonio-nitrate gelatine emulsion: if you will turn to the third paragraph of my letter on page 178 you will see that I experienced a nearly similar appearance—except that the colours were repeated on wetting the film—in a gelatino-chloride plate, which I sent to you at the time. Thus I do not think we need attribute the effect to the action of ammonio-nitrate in particular.

If gelatine plates are coated very thinly, the edges seem liable to become incapable of "taking on" the developer, or indeed of being wetted by water alone, as if they were merely dirty glass. At a quarter of an inch or so from the edges an irregular ridge is formed, being the commencement of the easily-wetted part. How is this? I have noticed that plates which have been kept some time often become less easily wetted.

As you say, in your "Answers to Correspondents," Mr. Forrest still prepares the ruddy brown-coloured glass. It is very non-actinic, but, at the same time, does not allow much light to pass. I have it in a lantern, but though the lamp has a petroleum burner the light is very deficient. I should not use it did I not prefer to be on the safe side when experimenting with gelatine emulsions. I have tried glass coated on both sides with varnish coloured with turmeric, as suggested by yourselves; but the light produced effectually fogged a gelatine plate in less than an hour.—I am, yours, &c., HERBERT B. BERKELEY.

Cotheridge Court, Worcester, December 4, 1876.

THE DEVELOPMENT OF GELATINE NEGATIVES.

To the EDITORS.

GENTLEMEN,—A few weeks ago a paragraph appeared in your Journal from a gentleman (in Dublin I believe) advocating the use of Epsom salts in the water used for developing gelatine dry plates. Perhaps some of your readers may like to know that no fear of fringed edges or blisters need be apprehended if the salts be used.

I myself was very dubious when I read the paragraph in question, as I had tried so many things and failed. However, as I had three of Kennett's plates on the shelf in my dark room I thought there could be no harm in trying one. On developing no fringed edges or blisters appeared, though in a second plate, having inadvertently washed it under the tap with ordinary water, the edges fringed in less than half-a-minute. A wash of the salts and water, however, saved the film. The proportion I used was half-an-ounce of salts to about a quart of water. The developer was mixed up with a portion of this, and the remainder used in soaking and washing the plate.

If your readers will give the salts a trial I think they will not have to complain again of fringed edges or blisters.—I am, yours, &c.,
EDGAR E. WIGGLESWORTH.

Greenfield House, Farnworth, near Bolton,
December 1, 1876.

A PHOTOGRAPHIC SOCIAL MEETING.

To the EDITORS.

GENTLEMEN,—Most of those who are in the habit of attending the ordinary meetings of the London photographic societies have remarked with what avidity the members hasten to dissolve the assembly and fall to conversation and pleasant chat.

Is it breaking confidence in an unseemly way to suggest that it is this latter part of the meeting which is peculiarly welcome to many? Does not genial converse ever and anon lead the assembled "scientists" to adjourn to "another place" where, stimulated and soothed by the fumes of the weed, they compare notes till a late hour?

At the meetings of the Parent Society refreshments are provided, but they are partaken of as a kind of passover, in haste, and with the loins girded.

It has been suggested that it might be agreeable to many to form a place for cheerful meeting occasionally, if arrangements could be made for a suitable central room near Charing-cross, where members of the black craft could meet and smoke and take coffee or ——— together. It is hoped before long to be able to communicate to your columns some definite proposal on the subject.—I am, yours, &c.,

A South London Man.

EXCHANGE COLUMN.

I will exchange a capital pony and set of harness, and a dark cart made to suit same, for a good piano or a valuable lens.—Address, C. W., Post-office, Bracknell, Berks.

I will exchange a first-class magic lantern, three and seven-eighths condenser, for a rectilinear *carte* lens and camera.—Address, Henry Holman, Jun., 4, Shoe-lane, Aberdeen, N. B.

Wanted a 12 × 10 air-tight glass bath in exchange for a quarter-plate lens and camera by Lancaster, in good condition.—Address, Photo., Mr. Baker's, 207, Bristol-street, Birmingham.

I will exchange a Bowman cabinet rolling-press, almost new, size of plate 12 × 7, for an American cabinet camera, or one of a similar make.—Address, D. Burden, 147, Duke-street, Glasgow.

Whole-plate bellows camera, half-plate lens, stereo. camera, diamond cameo camera, two rolling-presses, &c., will be exchanged for posing chair, backgrounds, or other articles useful in photography.—Address, H. Dunbar, 74, Paradise-street, Liverpool.

ANSWERS TO CORRESPONDENTS.

☞ *Correspondents should never write on both sides of the paper.*

George Hudson.—The lens you employ is of much too short a focus. Unless it be at least fifteen inches in focus it will not answer the purpose for which it is intended.

M. J. B.—When you are ready to exhibit the pictures in the northern suburb kindly drop us a note; for attending a similar exhibition in the extreme south of London we must at present ask to be excused.

J. Johnston.—We are still experimenting with the salt and emulsion sent; but, as we have already dealt so fully with the matter, we shall defer further remarks until we have gained more insight into the peculiarities of the process. We are interested to learn that you worked over the same ground as ourselves.

E. S. M.—If the albumenised paper be immersed for a few seconds in boiling water the albumen will immediately be coagulated, and you will not be able to effect its removal from the paper. But remember this—the water must be very hot; if it be only slightly warmed it will dissolve, and not coagulate, the albumen.

Lenticus.—Mr. C. B. Boyle, of America, was, so far as we recollect, the first who adopted the since well-known system of combining a large front with a small back lens, both of these being positive or magnifying combinations. To the lens resulting from his introduction of this system was given the designation of the "ratio" lens.

J. White (Littlehampton).—If the top light be overpowering in comparison with the side light it will have to be somewhat subdued. This can can be done by interposing a muslin screen of such dimensions that its angle, with relation to the sitter, shall very greatly exceed that of the *direct* light. The practical effect of such a screen will be to soften the intensity and extend the area of the top light. If reflectors are to be employed they may consist of any suitable material of a pure white colour.

Alpha.—Flare in lenses may be divided into two parts—optical and mechanical. The symptoms you point out indicate that the flare with which you are so persistently troubled is of the latter kind. To discover its cause point the camera towards a well-lighted landscape above which is a bright sky. Remove the focussing-screen, throw a large and very dark cloth over your head, and, with your eyes at a distance of six or eight inches from the plane of the focussing-screen, examine the appearance of the lens. You will see false light somewhere.

J. M'Adam.—About nine or ten years ago a suggestion relative to the value of collodion as a preservative agent for silver prints, which was made at a meeting of the South London Photographic Society, was eagerly seized upon, and for a time extensively practised. But, alas! for its anticipated value in protecting prints from fading! It was found after a short time that prints which had been unprotected by collodion retained their pristine vigour for a much longer period than those which had been subjected to its conserving agency. Hence the collodionising of prints with a view to increase their permanence has long since been discontinued.

Rev. F. H.—If the condenser be one of a high class the rays will converge to a point the dimensions of which (a contradiction in terms, you will say) will be similar to that of the luminous point, or small circle of light upon the lime ball; but few, if any, of the condensers made use of in the ordinary magic lanterns are so perfectly corrected as to do this, and in most cases it is not necessary that they should be. Perfect correction cannot be obtained in a condenser formed of two lenses only. Some time ago we had a condenser constructed on the principle advocated by Professor Henry Morton—an account of whose condenser, together with its various curves, was published in this Journal—and with it we obtained a clear and beautiful spot of light, so small as to be made available for the illumination of a microscopic object, the *whole* of the light being afterwards transmitted through the object-glass of the microscope.

Thomas.—1. It is more than probable that the collodion will answer well. Carry out your intention respecting it.—2. The symptoms described indicate that there is something defective about the lens. By returning it to the makers they will, no doubt, be glad to be afforded an opportunity of rectifying anything that may be discovered to be wrong.—3. The defect described can only be rectified by making use of a smaller stop than you must have employed. A swing-back will not remedy the defect of want of uniform sharpness, for, on the contrary, it will somewhat increase the evil; but in all cases when photographing buildings which render necessary the tilting upwards of the camera a swing-back is required in order to prevent the lines of the building from converging. A note addressed to the maker of the camera will procure a response to your query concerning the possibility of making the alteration suggested.

Iphigenia.—Our fair correspondent has experienced much annoyance in connection with the making of a solution of india-rubber, which, she correctly observes, ought to find a place among the *impedimenta* of every one who devotes a little leisure time to photography as a pastime. She has tried various samples of rubber, using the purest benzole that she can obtain in her native city (York), but without any effect; the rubber will *not* dissolve, and she inquires if we are able to throw any light on the matter.——We observe, in reply, that the great bulk of the india-rubber of commerce, speaking from the point of view of the ordinary retail shop, is prepared with a view to its being utilised for rubbing out pencil markings from paper. We know, from experience, that such preparation means its being wholly or partially vulcanised, and we further know that rubber thus treated is not amenable to the action of the usual solvent. In some shops it is possible to procure very nearly pure rubber—"bottle rubber" being a term by which it is often designated. This is usually of a dark, dingy yellow colour, in some places even quite black, on the outside; but when cut it displays the interior of a dingy white colour, striated, and possessing a very strong and very peculiar odour not unlike that of preserved fish which has been over-smoked. If *this* kind of rubber be subjected to the action of the recognised solvents of caoutchouc it will be found to dissolve with great facility. It is to be observed that exposure to the air for some time renders the surface insoluble; hence it is a wise precaution to pare off the dark outside skin before placing the rubber in the solvent. India-rubber consists of two bodies—one soluble, the other insoluble, in benzole. By allowing the mixture or solution to stand for a day or two no difficulty will be experienced in effecting their separation.

Received.—R. C (Liverpool). In our next.

Photographic Society of Great Britain.—At the next meeting of this Society, at 5a, Pall-mall East, to be held on Tuesday next, December 12, Capt. Abney, R.E., F.R.S., will read a paper containing details of photographic operations connected with the Arctic expedition, from notes by Mr. Mitchell, of the *Discovery;* also, Mr. Mawdsley will describe *A New Method of Working in the Field.*

Spectroscopic Photographs.—We have received from Mr. G. H. Murray, of Guildford, a collection of examples of spectroscopic photographs recently taken by him. These comprise spectra of metals and gases, among the former being zinc, lead, iron, copper, magnesium, bismuth, tellurium, thallium, iridium, cadmium, zirconium, selenium, and aluminium. These photographs are distinct to a charming extent. They are taken under circumstances which will be well understood by spectroscopists when we say that the metals themselves formed the "points" in the spark apparatus. The battery power employed consisted of four half-gallon bichromate batteries used in conjunction with a coil of large dimensions.

METEOROLOGICAL REPORT,

For two Weeks ending December 6, 1876.

Observations taken at 406, Strand, by J. H. Steward, Optician.

These Observations are Taken at 8 a.m.

Nov.	Bar.	Wind.	Wet Bulb.	Dry Bulb.	Max. Tem.	Min. Tem.	Remarks
23	30·21	SE	37	40	41	38	Dull
24	29·98	SSE	39	41	45	38	Foggy
25	29·52	SE	45	45	55	40	Raining
27	29·38	S	48	49	54	48	Raining
28	29·48	W	39	41	48	40	Cloudy
29	29·54	W	38	39	47	37	Foggy
30	29·73	SE	41	42	52	37	Foggy
Dec.							
1	29·45	SW	51	52	58	40	Cloudy
2	29·28	W	51	53	55	51	Dull
4	28·42	SW	48	52	53	50	Cloudy
5	28·96	SW	50	52	53	48	Dull
6	29·09	W	45	46	—	45	Dull

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THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 867. Vol. XXIII.—DECEMBER 15, 1876.

A NEW APPLICATION OF THE GELATINO-BROMIDE PROCESS.

All who have worked to any extent with the gelatino-bromide emulsion must have experienced from time to time mixed feelings of pleasure at the remarkable results obtainable by its means, and of regret that its scope is comparatively limited, on account of the peculiar properties of the gelatine itself. Where dry plates of the greatest degree of rapidity are desired it is undoubtedly a boon, as it is possible to obtain very great sensitiveness without the trouble and uncertainty attached, under similar circumstances, to the collodion emulsion. Add to this the simple character of the materials required, and their cheapness as compared with the ether, alcohol, and pyroxyline they replace, and we must cease to wonder that many amateurs show a strong predilection in favour of gelatine in spite of its drawbacks.

Under the latter heading, setting aside the extra care and trouble necessary in preparing the plates (the existence of which is, indeed, denied by many of the regular workers of the process), we may reckon the fact that hitherto it has been found impracticable to work the gelatine emulsion in the wet state. This will be considered by some of our readers as a matter of little import, and so, perhaps, in a general way it may be; but others—and we must confess ourselves to belong to that number—will readily recognise the convenience arising from such a power (if it only existed) in certain cases of emergency. It is well known that the ordinary collodion emulsions may be employed in the wet state with great advantage as regards rapidity; and as many amateurs, whose time is almost wholly devoted to landscape work, do not possess a silver bath, or, at best, have not one in proper working order when a sudden call is made to take a portrait, the wet emulsion proves a very useful and efficient substitute, being infinitely more simple in its manipulation, and but little inferior in point of rapidity.

But those amateurs who work only the gelatine emulsion are debarred from using it in the manner spoken of, as it has been found not to work satisfactorily if exposed and developed before the film has become thoroughly dry, which, of course, occupies a considerable time. It may be urged that the dry gelatine plates are sufficiently rapid to render the use of wet ones quite unnecessary for portrait work, but, unfortunately, a stock of prepared plates is not always at hand in case of emergency; hence gelatine compares unfavourably with collodion in this respect.

The difficulties in the way of applying the gelatine to the purposes suggested are chiefly of a physical rather than a chemical nature; the undried film after exposure, though perfectly capable of development, fails to resist the action of the solutions without blistering, wrinkling, puckering, and, perhaps, dissolving—a combination of effects which are anything but conducive to the production of satisfactory work. Any expedient, therefore, which enables us to remove these difficulties without injuring the other qualities of the film must be considered as an addition of power, and even if it confer no greater degree of sensitiveness, such as is the case with collodion, the rapidity of the emulsion is already sufficient to render it perfectly available. Such an expedient we now intend to describe.

In speaking of the action of tannin and other substances upon gelatine films in our last week's issue, we promised our readers that we would this week describe a new application of the gelatine emulsion. This consists in the employment of the emulsion in its wet state, the difficulties hitherto existent being overcome by treating the film, as soon as properly set, with any of the substances discussed last week. The effect, briefly explained, is to harden and consolidate the gelatine and render it less liable to the various defects caused by the action of the solutions while in the swollen and tender state, and how far this object is attained will be gathered from the succeeding remarks.

Of the various substances used, namely, tannin, pyrogallic, and gallic acids, the first-named exercises the most powerful effect, gallic acid the least. Tannin alone, however, even in weak solution, appears to act rather too powerfully; for, though it works admirably in rendering the film insoluble and preventing blisters and wrinkles, it retards development too much—not chemically, by restraining the action of the solution, but mechanically, by shutting up the pores of the film and rendering it impervious to water. So far as our experience goes this effect is not, however, an inevitable one, for some of our earlier experiments with tannin alone were tolerably satisfactory; but we have not as yet discovered the secret which will enable us to work with certainty. Pyrogallic acid, while not hardening the gelatine to nearly so great an extent as tannin, is devoid of the property of closing the pores of the film which renders the first-named objectionable; the films prepared with pyro. require much more careful treatment than those in the preparation of which tannin has been used. Gallic acid is for this purpose comparatively useless, as its action appears to be too feeble to produce any beneficial result.

We will now proceed to give the formulæ with which we have been able to produce the best results, though it is probable that practice will cause them to be materially altered. As regards the emulsion itself, we opine that the formula is a matter of no importance, except as it affects the sensitiveness of the resulting plates, just as it would do if the films were allowed to dry. We have used a simple formula of our own, as well as that published by "Franklin" some months ago, the only difference in the result being that the latter was slightly more sensitive. There is, however, one element in the emulsion which must be taken into the calculation, as possibly, or (from our own experience we may say) certainly, affecting the result—that is, the gelatine. We have employed two samples with varying success; but as we are unable to trace the cause of the variations, we must leave that matter untouched, merely remarking that Nelson's opaque gelatine gives good results.

The plates are coated and levelled in the usual manner and allowed to set, which at this time of year occupies but a few minutes; they are then plunged into the preservative bath, which should be kept as cool as possible, not so much to avoid re-solution of the film as to prevent blisters, &c. The bath we have used with greatest success is composed of—

Tannin	10	grains.
Pyrogallic acid	30	„
Alcohol	2	ounces.
Water	8	„

The tannin and pyro. in combination appear to act more satisfactorily than either one alone. The length of time the plates are allowed to remain in the bath is a matter of some importance, but depends a good deal upon outside circumstances. From five to ten minutes will generally be found sufficient. If too short the development will be unequal and the film tender and easily damaged, as well as liable to blister; if, on the contrary, too long, the film will repel the solution, which is with difficulty kept on the plate, while the development will be slow and incomplete. A little practice, however, will soon give the proper time.

Upon removal from the preservative the plates are rinsed with cold water previous to exposure; if a number be prepared at once they may be transferred to a dish of clean water and allowed to remain until needed for use. The development is effected in the ordinary manner, commencing with a four-grain solution of pyro., the bromide being entirely omitted, as the tannin appears to exercise sufficient restraining power during the first stage. The image comes up rapidly, and when the details have made their appearance a small quantity of bromide and a further dose of ammonia are to be added to the developer, when density may be obtained with the greatest facility. The fixing is performed in the ordinary manner.

As regards rapidity, we are not able to say decidedly that there is any real gain; but it is certain that the nature of the film, by permitting the developer to penetrate well into it, enables us to attain density in the fainter details with a given exposure, when such would be impossible under ordinary circumstances. The rapidity may, therefore, be reckoned as about equal to that of a dry plate prepared from the same emulsion. In conclusion: we think this method may prove useful to some of our readers, and therefore recommend it to their attention during the winter months, in order that they may render themselves *au fait* with it ere the busy season recommences.

MOIST SENSITIVE PLATES IN THE FIELD.

One of the most interesting topics that could be brought before a photographic society, and one which, we may add, is at the present moment of very great value, was brought before the Photographic Society of Great Britain by Mr. P. Mawdsley, of the Liverpool Dry-Plate Company.

The greatest objection against the dry process when contrasted with the wet is that which is embodied in the well-worn and yet forcible and pithy expression—"I like to see what I have obtained before I leave the field, and this I cannot do when using dry plates."

To many amateurs this objection has no power or validity; they expose plates with the preparation of which they are thoroughly conversant, and they bring them home and develope them in the certain expectation, or at least hope, of their producing good negatives.

But there is another view of the question. In the great majority of instances in which dry plates are used the production of a negative does not involve commercial interests. One man goes on a tour—say through the Highlands of Scotland—and he takes with him a camera and a number of plates by which to secure mementos of his tour; another passes over the same country, and also takes with him his camera and chemicals, but with an entirely different end in view. To the former photography is but an accessory to a pleasant journey; to the other it is the *primum mobile* to that journey. Hence the production of a photograph in the one case is quite a different matter compared with that in the other. With the latter there must be no uncertainty; it is a part of his duty to obtain a certain view, and he has travelled many miles to do so. Were he to leave the spot without knowing whether or not he has succeeded in the object for which he has travelled to such a distance and incurred so much trouble and expense, he would be guilty of an act that could not be characterised by sagacity or discretion.

Again: dry plates of the "sure and certain" kind are not always noted for their sensitiveness, but are generally the reverse. With a view to effect a compromise between the dry and wet processes "moist" methods of preparing plates have been strongly recommended by several experimentalists. In plates of this kind, prepared with such hygroscopic bodies as honey, syrup, glycerine, and the like, the collodion film, after its removal from the bath, is coated with one or other of these or similar substances, and is thus prevented from becoming dry for a period more or less protracted.

Attempts of a tolerably successful nature have been made to combine this "moist" preservative with the well-known advantages of bromised films and alkaline development, such combination affording a means of preparing plates which, while they retain their excellence for several hours, are so sensitive as to receive an impression in the camera with as brief an exposure as wet collodion. In all these advances, excellent and undoubted though they be, there is still present the element of uncertainty of the result obtained while one is yet on the field of artistic action.

It is at this stage that Mr. Mawdsley took up the matter on Tuesday evening. He demonstrated in the clearest and most convincing manner two points replete with interest—first, that in the preparation of moist plates which are not less, however more, sensitive than plates prepared by the ordinary wet collodion process, a bath need not be employed at all, but that it can be done most effectively by an emulsion process; and, secondly, that plates thus prepared at home and taken to the field can in a very easy manner be developed before the photographer leaves the scene of his operations.

In what manner these advantages are secured will, we expect, be fully described in our next number, when we publish Mr. Mawdsley's paper; but in the meantime we shall here present such a *résumé* of the process as we gleaned from seeing it demonstrated at the meeting in question, and which will enable our readers to try it for themselves.

The plate, having been coated with collodion emulsion, is washed, and is then coated with a preservative, or organifier, composed of one ounce each of glycerine and albumen, diluted with twenty ounces of water. These proportions may be considerably varied. For example: if the plates are to be kept for a long period the proportion of the gylcerine may be increased to twice that of the albumen, that of the water being, at the same time, much diminished.

In developing the image the plate is first flushed with a saturated solution of carbonate of ammonia, which, having been poured off, is followed by an application of a strong aqueous solution of pyrogallic acid.

The plate that was so successfully developed at the meeting had been prepared three weeks.

A SELF-ACTING OXYGEN APPARATUS.

We have at length had an opportunity afforded of seeing in action Young's patent oxygen generator and safety lime-light apparatus. It will be remembered that two articles on this apparatus have already appeared in our respective issues of October 27 and November 3, and that we then expressed our intention of reverting to the subject as soon as, from actual inspection, we were in a position to do so. This, as we have said, we are now enabled to do.

When packed up for a journey—the state in which it was when we first saw the apparatus—it formed a compact galvanised iron box, twenty-two inches in height, ten inches wide, and fourteen inches deep. In this small space was contained everything requisite for giving a lantern entertainment, including the apparatus for generating oxygen, the holder or reservoir for storing the gas, and, not least, a large biunial dissolving lantern, with four-and-a-half-inch condensers. When the package was undone the case was found to form a water-tank, in which a similar case of smaller dimensions, fitted gasometer fashion, was guided in its vertical motions upwards and downwards by a light and yet exceedingly rigid framework, which fitted into the square tank, and terminated in a square table, at a height of forty-five inches from the floor. Upon this table the lantern is erected, this height being all that is considered necessary for lantern exhibitions. This framework, therefore, serves the twofold purpose of

being a stand for the lantern and an enclosure for the gas tank. Projecting from one side of the framework and near its top is a cylinder of iron, with a cap on the outer end as a cover. This cylinder is, in reality, a retort, which is heated by a gas-pipe below, in the upper side of which is a series of small holes; this arrangement is simply an atmospheric gas-burner.

Let us now suppose that an illustrated lecture is about to be commenced, that the lantern has been unpacked and erected in its place, some water poured into the tank, and that the atmospheric or Bunsen gas-burner has been connected with any gas-burner in the room; while the lecturer is commencing the introduction to his lecture, which may occupy five to ten minutes, the exhibitor commences to make his oxygen. For this purpose he uncaps the end of the cylindrical retort of which we have spoken, takes from his pocket or elsewhere one of a number of ten cartridges, of which he is supposed to have a goodly store in his possession, inserts it into the cylinder, which he re-caps—an operation which, altogether, does not occupy ten seconds—lights the Bunsen burner below the cylinder, and puts slide No. 1 into the lantern. In a few minutes the oxygen is heard bubbling up into the tank, which rises up in the frame. The common gas, regulated by a tap of special construction, and a portion of which has been allowed to be burning all this time at the jet in order to heat the lime, is now turned off from the Bunsen burner; for it is found that if this be done sufficient heat will have already been generated to ensure the production of oxygen going on until the whole of the contents of the retort cartridge have been decomposed. These contents, as we have described in a previous article, are composed of chlorate of potash and peroxide of manganese. The oxygen is now "turned on" and the exhibition proceeds.

After a time the sinking of the gas-holder to a certain distance intimates to the exhibitor that it is time to provide for a fresh supply. He consequently gives a quarter of a turn to a screw outside the end of the retort, by which action the end is removed, pulls out the old cartridge with its charred contents, inserts another cartridge (breechloader-wise), closes the end, turns up the Bunsen flame underneath, and everything goes on as before. In this way a supply of oxygen of the finest quality may be obtained during an entertainment lasting any required number of hours.

In the foregoing we have merely described what we, in company with two other gentlemen quite familiar with the lantern as applied to public exhibitions, saw in actual operation.

We may here state that Mr. Young, the inventor and patentee, showed us other modifications of the system, some of which are described, with all the requisite details, in his specification, published at page 521. We have here, however, confined ourselves to a description of the apparatus as we saw it in operation.

It is many years since we, in an article suggesting the use of compressed oxygen in iron cylinders, asked—"Who shall deliver us from gas bags?" and, as a practical response to our suggestion, compressed gas was introduced. But in automatic gas-making while the exhibition is actually proceeding—gas-making, too, freed from everything that savours of danger, mess, or unpleasantness—we have the highest development of comfort as associated with the oxyhydrogen light.

But the majority of photographers will see, in the apparatus just described, something of still greater importance than an appliance for exhibiting transparencies to the multitude. They will soon realise the fact that in the production of enlargements it will prove a boon of great value; for, while it occupies only a very small space, it contains a supply of oxygen always in readiness to be made use of in the projection of an enlarged image upon a sensitive surface This boon cannot be secured by means of oxygen supplied from a bag, on account of the rapidity with which it becomes deteriorated, as it is well known that when thus kept for more than one or two days, it becomes wellnigh worthless. In the metallic gas-holder, on the contrary, the oxygen will keep good for a long period; and this feature, quite apart from the extreme facility with which it can be made at a few minutes' notice, must commend itself to every practical photographer.

INCREASING THE INTENSITY OF FEEBLE EMULSION IMAGES.

We desire to direct special attention to a statement made on Tuesday evening last by Captain Abney, F.R.S., at the meeting of the Photographic Society of Great Britain. The statement was not made formally, but rather in an off-hand manner—a subject, in short, which, although at present merely hinted at, must hereafter receive more ample treatment.

It is known to those who are conversant with the *modus operandi* of the most rapid emulsion plates that great rapidity is unfortunately associated with thinness of image—a fact well recognised by those who have made or make plates by the process first introduced by Mr. M. Carey Lea, and since carried out commercially by others. When a plate of the very rapid kind is exposed it gives a feeble image, the further intensification of which is attended with great difficulty.

This objection is now in a fair way of being entirely overcome; for Captain Abney has found that if one of these rapid and thin plates has been exposed and, previous to development, received a second coating of emulsion—in this latter case an emulsion giving an *intense* image—an image will be developed possessing the special qualities of both emulsions, namely, the rapidity of the first with the intensity of the second.

Captain Abney has further discovered that the *image* when developed is found to be embodied quite as much in the film last applied—applied after exposure, be it remembered—as in that which was exposed to light. Of course, there must be an application of some substance that will act as an intermediate film to prevent the one collodion film from exercising a solvent action on the other, albumen being that which, in most instances, has been employed.

The subject is one which, when fully investigated, is destined to throw some light upon the action of light, with regard to its chemical or physical nature, upon the sensitive film. But waiving, meanwhile, such theoretical hypotheses as may yet arise, it is valuable to know that in practice a highly-sensitive collodion plate, which might otherwise give a very feeble image, may now be made to yield one possessing as much vigour as can be desired.

We consider this discovery of Captain Abney's as one of the greatest advances that has been made for some time, and we need scarcely add that, ere long, we shall have more to say upon the subject.

During the very cold weather experienced a few weeks ago we had demonstrated to us in a practical manner the value of the suggestions relative to the acid or alkaline condition of the sensitising bath and developing water used in connection with carbon printing. We had exposed a quantity of tissue during the day, but in the evening, upon proceeding to develope, the gelatine refused to dissolve except at a very high temperature, comparatively speaking. The tissue was cut from the same roll we have used with success upon previous occasions, and the exposures given were measured by means of the actinometer in the usual manner; the defect evidently did not arise from decomposition of the tissue or from over-exposure, and we were puzzled for some time to account for the difference in behaviour. After cogitating over the whole of the circumstances for some time we recollected a small matter which had not previously struck us as of much importance, namely, that we had been in the habit of using bichromate of ammonia for some time in sensitising; but that upon this occasion, having been short of that salt, we had made up a bath of the potash salt. We at once set to work to discover if this was the solution of the question, but having still no bichromate of ammonia, and at that time finding it inconvenient to procure any, we were content to make a bath as recommended by Mr. J. A. Spencer, by the addition of strong ammonia to the ordinary bichromate potash solution. A few small pieces of tissue were sensitised upon the new bath, and upon exposure and development next day the picture was brought out without the slightest difficulty, and without any departure from the ordinary temperature employed in developing. The next day

we made a comparative trial of tissue sensitised in three different baths, and found the results as regards solubility and ease of development to attach to the baths in the order named, viz.:—1st. Bichromate of potash and ammonia. 2nd. Bichromate of ammonia. 3rd. Bichromate of potash. By the addition of a drop or two of sulphuric acid to the bichromate of ammonia the solubility of the tissue was so much impaired as to be inferior to the potash salt. This experience may be of use to some of our readers in similar difficulties.

IRON AS AN INTENSIFIER.

[A communication to the Bristol and West of England Photographic Association.]

It has always been to myself a matter of surprise that the subject of intensification of negatives has received so small a share of attention; for, whilst modifications of formulæ for collodion, silver baths, and developers have been introduced by hundreds, the old intensifier of pyrogallic acid seems to be universally accepted as the one and only correct thing to use.

In making a choice of intensifiers the main object should be to select that which gives the most uniformly good results, with a minimum of failures and difficulties. After carefully-repeated trials and comparisons of the various modes of intensification, I have arrived at the conclusion that none of them is more certain and reliable than the one published by Mr. Valentine Blanchard many years since, consisting of protosulphate of iron and citric acid.

In appearing as an advocate of iron intensification I am not prepared to assert that the iron gives *better* results than pyrogallic acid; but, I think, I may safely say that, whilst the results are fully equal, the advantages of iron in other respects are as ten to one. The first advantage I may claim for an iron intensifier is its simplicity in use; for, when intensifying with pyrogallic acid, it is a matter of absolute necessity that after development the plate should receive a thorough washing, which can only be effected with copious supplies of water, before intensification can be proceeded with. On the other hand, in using iron to intensify no working is needed after development, the developer being simply poured off the plate, and the intensification continued without the intermediate washing. To effectually wash an $8\frac{1}{2} \times 6\frac{1}{2}$ plate from pyrogallic acid I find it requires at least twenty ounces of water, which is dispensed with when using iron to intensify. To the landscape photographer, encumbered with a tent and working at a distance from a spring or supply of water, this is no small advantage.

The second advantage of iron intensification is the saving in time; for the intensification can be effected in less time than would be taken up in the intermediate washing when using pyrogallic acid. The saving in time thus effected will be fully appreciated by those who have worked in a small tent on a hot summer day, when the air of the tent becomes almost insupportable.

The third advantage is the saving in cost; for, whilst pyrogallic acid costs from three shillings and sixpence to four shillings per ounce, protosulphate of iron may be bought for fourpence per pound. Although the question of cost is one which should, I think, as a rule, be disregarded by the amateur, yet, the results being equal, preference should be given to the cheapest.

The fourth advantage is that the iron intensifier may be made in large quantities and kept ready prepared, whereas the pyrogallic solution rapidly decomposes and becomes useless after being mixed a few days; especially is this the case in hot weather. On the other hand, the iron solution improves by keeping, for I find the longer it is kept the better it works, giving cleaner and more brilliant pictures than when freshly made; in fact, I would recommend mixing it at least a month before being required for use.

The fifth advantage is that of cleanliness. The stains produced by iron are slight and easily removed, while the stains of pyrogallic acid are deep and removable with great difficulty. More especially is this the case when the pyrogallic acid comes in contact with any spot previously touched with iron solution; immediately the two come in contact ink is formed, this, together with the silver, causing stains which are removed with the greatest difficulty.

The sixth advantage of iron is that it never produces the copper-coloured fog in the shadows, which in hot weather it is almost impossible to avoid when using pyrogallic acid.

The seventh advantage of iron intensification is that the degree of intensity may be judged of more correctly, as the colour of the deposit is less variable than when using pyro. How common a thing it is when using the latter to obtain a negative which appears at first sight to have just the right amount of density, but on drying a change appears to take place, and it becomes so dense and harsh as to completely alter the character of the negative! Again: the colour of the deposit is so variable as to greatly mislead one. At one time it may be a cold, greyish tone, and at another a rich brown. These differences of colour, not being perceptible in the yellow light of the dark room, lead to frequent errors, causing the operator in the former case to discontinue intensification too soon, and in the latter case to carry it far beyond the necessary point, and thus spoil the negative. In using the iron intensifier the colour is subject to little variation, consequently the degree of density can more accurately be judged.

Last, but not least, the one great advantage of the iron intensifier is that it may be used either before or after fixing, without any preparation of the plate, whereas to intensify with pyrogallic acid *after* fixing it is necessary to apply a solution of iodine to ensure its action. Moreover, when used after fixing, I find that fog or stains are invariably produced.

Looking at these advantages, which are so manifest, it is to me a matter of wonder that iron intensification is not more generally practised. One or two objections to its use have been raised by the advocates of pyrogallic acid, who state—first, that it will not give clear shadows; secondly, that it clogs up the fine lines of the negative; and, thirdly, that it causes stains on the negative.

To the first of these objections I can but say that when the exposure has been properly timed, and the intensifier used in proper condition, fog in the shadows never occurs. As a proof of this statement I exhibit a few negatives, and I think you will admit, after seeing them, that the assertion that iron intensifiers cause fog in the shadows is quite unfounded. I admit that under certain conditions fog in the shadows may be caused by iron intensification, but that it is an inherent defect I cannot grant.

I may here point out one or two causes of fog and deposit in the shadows, and the means of avoiding them. First, the solution, if used immediately after mixing, may cause a slight veiling of the shadows. The remedy for this is obvious, namely, to prepare the solution as long as possible before being required for use, and I would recommend enough to be mixed and kept on hand for at least three months' consumption; it may be kept in a concentrated solution and diluted as required for use. I have sometimes found in keeping the solution for a long time that on the surface is formed a whitish fungoid substance, which is common to all mixtures containing citric acid. This may be effectually prevented by adding one or two drops of carbolic acid to each pint.

The second cause of fog arises from using too small a proportion of restraining acid. The proportions I find most suitable are—in winter, protosulphate of iron five grains, citric acid eight grains; in summer the critic acid may be increased to ten or twelve grains.

A third cause of fog is using the silver added to the intensifier in a neutral or slightly-alkaline condition. I find it works most satisfactorily when slightly acidified with nitric acid.

I think I may safely say that, if the iron intensifier be used as I have directed, fog arising from the intensification will be a thing unknown, and that a faultless negative in which fog does not previously exist cannot be fogged by a proper application of the intensifier.

With regard to the second objection raised by the advocates of pyrogallic acid, viz., "that iron intensifiers clog up the fine lines of the negative," I cannot do better than prove the fallacy of this assertion by exhibiting one or two negatives. In the negative marked A you will observe the laths of a venetian blind, which are wonderfully sharp, and certainly show no signs of clogging. I find that fifty of these laths occupy in the negative just three-eighths of an inch; therefore, the fine lines would represent the $\frac{1}{132}$ part of an inch.

Another more evident proof will be found in the negative marked B. The small cords forming the steps to the ladder are perfectly clear and free from clogging. Now, taking these cords as a quarter of an inch in diameter, the distance of the vessel from the camera as fifty yards, and the focal length of the lens as seven inches, would give these lines, at a rough calculation, as being rather less than the one-thousandth of an inch. This clearly proves that clogging is not in any way caused by an iron intensifier.

With regard to the assertion that the iron intensifier causes stains, I can only say that no intensifier I have ever used has, as a rule, worked so clean and free from stains as the iron. The few negatives I exhibit certainly show that, whatever may

be said to the contrary, stains are not necessarily caused by the use of an iron intensifier.

In conclusion: I trust that these few remarks will induce some of our members to give iron intensifiers a fair and unprejudiced trial, and I feel convinced if they do so that pyrogallic acid will soon be discarded, and make room for iron as an intensifier.

E. Brightman.

ALBUMEN.

[A communication to the West Riding of Yorkshire Photographic Society.]

This name is applied to a certain organic body which constitutes the characteristic portion of the white of egg and of the serum of blood, and forms a constituent both of the animal fluids and solids. There is also a vegetable albumen found in certain plants, such as the potato, carrot, turnip, cabbage, asparagus, and the green stem of the pea, &c., which has apparently the same composition as animal albumen.

The most remarkable character of albumen is the property it possesses of changing from a fluid to a solid state on the application of heat. This process is termed "coagulation." If the white of an egg be exposed to a heat of about 140° Fah. white fibres begin to appear in it, and if the heat be raised to 160° Fah. the fluid substance is converted into a solid mass, which is opaline and insoluble, and is possessed of considerable elasticity. If the heat be still further increased to 212° Fah. it dries, shrinks, and assumes the appearance of horn. It can, however, be dried at a temperature of 104° Fah. without being rendered insoluble, and it is in this form that it is usually met with in commerce. It is inodorous and tasteless, and is insoluble in alcohol and ether.

The chemical composition of albumen has not been ascertained with certainty, as it is so readily split up by different chemical agencies into many other substances for which it is difficult to obtain an exact chemical formula. Recent analyses, however, by G. S. Johnson, of some remarkable compounds of albumen with the acids confirm the formula originally proposed by Lieberkühn, namely, $C_{72}\ H_{112}\ N_{18}\ SO_{22}$. The percentage composition is in round numbers:—

Carbon	55	per cent.
Hydrogen	7	„
Nitrogen	16	„
Oxygen	21	„
Sulphur and phosphorus	1	„
	100·	

Albumen, whether obtained from eggs, blood, or plants, has the same constituents.

White of egg consists of about twelve per cent. of albumen, eighty-six per cent. of water, and small quantities of soluble salts. It is alkaline from the presence of a little soda. Raw white of egg has no smell of sulphuretted hydrogen, and does not blacken silver; but after boiling both these properties are manifest, showing that it suffers some decomposition during coagulation.

In proportion as albumen is diluted with water it requires a higher temperature to coagulate it; but water with only $\frac{1}{1000}$ part of its weight of albumen dissolved in it is rendered opaque by boiling. After coagulation it is no longer soluble in water unless heated with it under pressure, but it dissolves in caustic alkali. The only chemical change that can be traced is the loss of alkali and soluble salts, which are removed by the hot water.

Albumen is coagulated also by alcohol and by all the stronger acids, as sulphuric, nitric, and hydrochloric acids; but not by acetic acid, as that dissolves it. It is also coagulated by the metallic salts, such as chloride of tin, chloride of gold, and acetate of lead; and so delicate a test of the presence of albumen is bichloride of mercury that, if a single drop of a saturated solution of that salt be let fall into water containing the two-thousandth part of albumen, it will occasion a milkiness in the water and produce a curdy precipitate. Albumen is also coagulated by the action of voltaic electricity.

The yolk of egg contains a modification of albumen called "vitelline," and owes its yellow colour to a yellow oil, which may be extracted by ether, and contains phosphoric acid.

It is a well-known fact that certain industries consume a very large quantity of albumen in some shape or other. Sugar refiners, tanners, and glove-leather makers employ albumen in a more or less pure state—in some instances the yolk of egg only; but the calico printers are the largest consumers, it being used by them as a mordant for dyeing cotton goods with aniline colours. This consumption is steadily on the increase. A short time ago it was stated in a scientific paper that the printing-works of Alsace alone consumed annually more than 150,000 kilogrammes of dried albumen, representing rather more than thirty-seven millions of eggs, or the production of 250,000 hens. Add to this the consumption of the printing-works in the other parts of France and of other countries, and there is very little doubt that annually some one hundred and fifty millions of eggs are used for that purpose alone.

Two kinds of dried albumen from blood are known in commerce, namely, the natural albumen without gloss, and patent or glossy albumen. The white of egg can also be purchased in the form of a dry powder, and it has been proved to be perfectly soluble. Dr. J. Schnauss has already borne testimony to its value in the preparation of dry plates, and, being in the form of a powder, it is very economical, as no more solution need be prepared than is required.

Albumen has never been obtained perfectly free from saline matters, particularly the alkaline and earthy phosphates; and for photographic purposes it is very probable that the sulphur present in albumen is very detrimental to silver prints. Experiments have been made from time to time by chemists, with a view to the separation of the sulphur from albumen, and whether, if it were removed, the albumen would still retain its properties is yet an open question. That there is reason to believe that some process will yet be discovered may be inferred from the fact that M. Schützenberger has ascertained that when pure albumen is coagulated by heat it always leaves a small amount of soluble residue, amounting to from five per cent. to seven per cent. of the original albumen. He states that this residue is of a clear yellow colour, has a bitter taste, and, what is of more importance to photographers, contains sulphur. Although the albumen after being coagulated is of no use to the photographer, still it is a step in the right direction, and, perhaps, we may ultimately be able to prepare albumenised paper, &c., without having the presence of this deleterious substance.

The defects in some albumenised papers may also be attributed to the fact that highly-glazed paper is much in demand, and it can only be produced from albumen that has undergone fermentation. Such paper is often unequally sensitised, shows circular markings, tear-drops, and blisters, as pointed out by Mr. Bovey some time ago.

Albumen is often recommended as a coating to plates before the coating with collodion, and is no doubt of great service in the working of dry plates, but probably a fruitful source of injury to the silver bath if adopted in the ordinary wet process. Clean plates and good collodion render its use unnecessary. If used it should be a weak solution, about one part of albumen to twenty or twenty-five parts of water, and filtered before use.

In conclusion: I would say that, although dry albumen from a good maker can be relied upon, still there is no doubt that the cheaper qualities are adulterated with such substances as gum, dextrine, or British gum, or starch, and sometimes without being adulterated may be of inferior quality, owing to having been dried at too high a temperature.

In reference to gelatine I can say very little; it is prepared from animal substances only. The quality generally used by joiners as glue is prepared from the refuse of the tan yards, consisting principally of scraps and parings from the raw hides, though it can and probably is prepared in some places from bones. Isinglass is a very pure variety of gelatine prepared from the air-bladder of fishes, more particularly that of the sturgeon. The composition of gelatine is usually stated by the following formula:—$C_{41}\ H_{67}\ N_{13}\ O_{16}$, and also a trace of phosphates of lime and magnesia.

The characteristic properties of gelatine are the tendency of its solution to gelatinise on cooling, and the formation of an insoluble compound with tannic acid and some other substances—for instance, chrome alum by the action of light. The formation of an insoluble substance by the action of tannic acid is the foundation of the art of tanning, and the action of light on a mixture of chrome alum and gelatine the essential principle in the production of carbon prints. A solution containing only one per cent. of gelatine will set on cooling, and this property renders it valuable in the making of jelly, size, and glue, though if repeatedly boiled and cooled it loses this property.

Gelatine is largely used for sizing paper, clarifying liquids, such as wine and beer, and as a cement. It is also used in various ways in the art of photography, with which, no doubt, many present will be more familiar than I am.

A. Clark.

THE LEGITIMATE USE OF RETOUCHING NEGATIVES.

[A communication to the Glasgow Photographic Association.]

There is a good deal of truth in the remark made some time ago that the photographic field has been ploughed over, crossed, and recrossed so often that it is difficult to hit on a corner that has not had ample justice done to it by many able and willing labourers,

and the legitimate use of the pencil on negatives has not been overlooked, having been recently occupying the attention of our go-ahead cousins, and in our own country has had devoted to it papers both in societies and journals.

I have often thought that a good deal more has been said than the question deserves, and we have been implored, from a great variety of considerations, to have nothing, or as little as possible, to do with the abominable practice, as it had a certain tendency to induce carelessness in the production of good negatives by placing reliance on the after-aids of brush or pencil to make up for slovenly and imperfect work.

We have been appealed to in strong and "tall" language to desist from perpetrating lies and libels on our patrons, and cheating posterity by sending down to them images which have been under the hands of the destroyer, bearing but a distant resemblance, shall we say, to the great-grandmother of the future possessor.

We have been reminded that a print from the touched-up and sophisticated negative formed an element in consigning an estimable nobleman to Dartmouth, and that questions of identity would again arise, and the mischievous and hurtful results would yet be exhibited in a crop of wronged, noble, and rightful heirs. In short, we were bringing a scandal and reproach on our profession by hiding what is beautiful in nature, and turning the human face divine into a mere haggis or the wax figure in a barber's window, which empty-headed patrons will persist in calling "beautiful."

Now, all this declaiming and prophesying and sighing for the days that are gone, when no one practised this modern wickedness, goes on the assumption that our chemical and optical appliances are perfect, that the conditions under which we work, are constant and uniform, and that all we did were truthful transcripts of the subject rendered; as if there were not drawbacks great and small which the most accomplished photographer could not overcome or conquer, and as if there were not wrinkles and incipient wrinkles or trifling scars, which in nature are hid by the complexion—freckles, which, to the eyes varies so little from the general tint of the skin as scarcely to excite observation, but which are rendered with an exaggerated obtrusiveness, magnified by a lens of high power, on a plate incapable of recognising the varying tints presented to it.

In my quiet moments, when meditating on the way by which I have been led (photographically), and on those from whose works and suggestions I have derived benefit, I have a feeling of gratitude towards him who suggested the use of the pencil on negatives, for giving me the power of supplying shortcomings, without which I could not get over—shortcomings which I always felt as a reproach, and compelled me often, with all my enthusiasm for the fascinating art, to stand behind words and bunkum to cover my weakness. In using the pencil it does not follow that you commit all these enormities that has been charged against it. It must be used with judgment and skill. It is an art and its use legitimate, and I find its use defined by the Editors of THE BRITISH JOURNAL OF PHOTOGRAPHY, which I hope you have all read, but which I will give you again to refresh your memories:—

> "Retouching is not only legitimate, but most necessary and praiseworthy, when it is confined to supplying such shortcomings as those from which photography, unfortunately, possesses no immunity. Wrinkles *will* persist in making their appearance on the negative with a potentiality which sets nature at defiance; freckles, which in the fair face of beauty can barely be seen, are shown in the more than truth-telling photograph as black spots; and defects of manipulation in the form of mechanical blemishes *will* come in an otherwise excellent negative, no matter what may be the amount of painstaking care displayed by the operator. To remove blemishes, to lighten shadows, to cause black freckles to depart, and to work such a marvellous change in the hard, dark, furrowed wrinkles of the negative pure and simple as to bring back the semblance of nature—to do all this, we say, is not merely legitimate, but most necessary and praiseworthy. If a person possessing red hair and beard have these hirsute appendages represented by intense blackness such a representation points most glaringly to the defects of photography, and its inability to represent tints or colours truthfully. From such delineation judicious retouching removes the reproach, thus permitting photography to conform more strictly to nature."

Now, then, having got rid of the reproach, and of doing that which is most necessary and praiseworthy—"permitting photography to conform more strictly to nature"—are we to stop here? Are we trespassing if we go a step farther?

I was reading the biography of Sir Joshua Reynolds the other evening, and I came upon the following:—"In 1779 Sir Joshua painted Gibbon's portrait, which hung over the chimney-piece in his house at Lausanne. M. Rodgers says—'In this wonderful portrait, while the oddness and vulgarity of the features are refined away the likeness is perfectly preserved.' And again: 'Cotton states that Miss Reynolds remarked Sir Joshua never gave a more striking proof of his excellence in portrait painting than in giving dignity to Dr. Goldsmith's countenance, and at the same time preserving the likeness.' To this treatment all Reynolds's sitters were subjected, so that the most deficient in face came off his easel ladies and gentlemen." Sir Joshua! that was a most iniquitous thing for you to be guilty of! We are cheated. Your colours may have been pure and your manipulation perfect, but by your generalising and your idealising we have not Gibbon—we have not a perfect transcript of nature. And your liberties with the countenance of Oliver Goldsmith are unpardonable. We do not want a refined and dignified Oliver; we want him as he was—unrefined and without dignity.

So says the pure photographer, but I cannot agree with him. I am not a scientific photographer engaged in ethnological studies regarding men, their forms, origin, relations, and differences. I aspire to something more than making maps and diagrams; and after having got a perfect transcript of nature, and my client not of Oliver Cromwell's disposition, if I can remove "the oddness and vulgarity of the features, and retain the likeness" I will have no compunction in doing so, and feel that if I am sinning I am doing so in good company.

The retouched portrait is wanted, and we must supply it. Do as little as you can, but you must not fall out with your bread and cheese. Some time ago two ladies came to me—one of them desiring to be photographed. In the course of conversation previous to sitting one of them asked me if I touched-up and modelled my negatives in the same style as Mr. Blank, of Blank. I answered "No, not to the same extent," but "that I did to the extent I considered necessary; that the extent to which he carried what he called 'modelling' was considered by many in the profession as positively vicious." They were much surprised to hear this. The lady was photographed. On the following day the same two presented themselves. Miss No. Two wished a sitting, but before beginning operations she remarked that she had been thinking over the conversation we had had over Mr. Blank's modelling, but that I was not by any means to give her any consideration, as she really desired to be done in the most vicious style possible. I did it, and have no regrets.

Another—a lady who, I can assure you, would not be chosen to sit as a model for Venus—I gave the legitimate touch to, and just did a little for her "oddness and vulgarity of countenance." The result was not up to her standard, and she must be taken again. From her remarks I gathered what was wanted. This time I gave her the vicious touch, and she gave me her order in the following terms:—"I am very well pleased with the *carte;* you have made me so good-looking that I scarcely knew myself." I said that I did think too much had been said regarding the use of the pencil on negatives.

How much touching up and making up will there be on your first sitter to-morrow? How much of art in teeth, how much of art in hair, how much of bustle and padding? and do any of those who have contributed to the make-up have any qualms of conscience about the legitimacy of supplying them? None, but they rather wish for a greater demand. We need have none either. There was a time when we could only take Cromwell with his "warts, wrinkles, and all," but *we* have got a *wrinkle,* and can now supply Queen Bess with as smooth insipidity as her vanity may desire.

Another objection which I noticed stated lately was the great difficulty in restoring the likeness when one had to copy a *carte* from a touched-up negative. There is a difficulty, but it ought to occur very seldom in practice if photographers were true and honourable to one another. I never copy a *carte* for an enlargement without exhausting every means of getting (for a consideration) the loan of the negative or a transparency from it, as, apart altogether from the difficulty of making a good enlargement, I hold that the man who took the negative and has it carefully preserved is justly entitled to a share of the profit when his work has become so valuable that an enlargement is wanted from it; and I am ready at all times to do the same when asked. When I undertake such work I always charge extra, to admit of my paying for the loan of a negative, or, if it cannot be got, to cover extra labour, as all copies require. If there were a proper understanding honourably carried out this restoring difficulty would be seldom experienced. JOHN HENDERSON.

THE AIMS AND OBJECTS OF PHOTOGRAPHIC SOCIETIES, WITH SUGGESTIONS FOR INCREASING THE PROSPERITY OF OUR OWN.

[A communication to the Edinburgh Photographic Society.]

IN occupying the attention of the members for a few minutes my object is not to propose any alteration in the way in which the Society has hitherto been conducted, and under which it has attained to such a large measure of success; neither is it to propose any particular addition to what may be called our "ordinary programme,"

but simply to throw out several suggestions with the view of leading to a discussion, the outcome of which may still more increase our prosperity.

The aims and objects of photographic societies generally, no doubt, vary according to circumstances; but there are a few things which they in common all seek to attain, and to these, or the most important of them, I intend at present to confine myself.

There are—first, the advance of photography, both as an art and a science, or artistically and technically; secondly, the educating and elevating of the public taste to appreciate the true and beautiful in art, whether exemplified in photography or painting; and, third, the bringing of men together who have much in common for that social intercourse which tends so much to remove the trade jealousies and round off the angularities so generally incident to the isolated members of a community.

Keeping these three objects in view, it will be evident that the first aim of those to whom the management of such societies is more immediately committed ought to be the securing of as many names as possible on the roll of membership, and the procuring of as large an attendance as possible at the ordinary and stated meetings. In our own Society the former has been obtained by a low rate of subscription, and the latter by securing that, as far as possible, a part at least of the proceedings shall be sufficiently popular to interest others beside those immediately connected with photography.

That the Edinburgh Photographic Society has been to a large extent successful there can be little doubt, and therefore I do not think that wisdom would be shown by any considerable departure from the present system of management. Our small rate of subscription requires a large number of members to bring the funds up to the required figure, and our popular meetings have done much to make the enlisting of non-photographers an easy matter; while the occasional distribution of prints at ordinary meetings secures, generally, a large attendance.

While, however, averse to disturb the present arrangements on the ground of their perfect suitableness to our requirements, I think that something additional might be grafted on to them that would tend still further to increase its prosperity and enhance the value, especially to those who can have but a limited interest in the papers of the Society read and discussed at the ordinary meetings.

I take it for granted that practical photographers are too much alive to their own interests to need any greater inducement than the ordinary papers and consequent discussions to ensure their attendance at the meetings; but in most communities the photographic element is too limited for the healthy carrying on of a society, and therefore it is that the sphere must be considerably extended. As this extension can only be made by special attraction the question arises as to what form that attraction ought to take. Probably the best way to arrive at an answer to the question will be to ascertain from the office-bearers if there be a weak point anywhere—a weak point in the armour—and then, having discovered it, see how it can be strengthened or repaired.

This in a small way I have attempted to do, and find that there is a weakness—a very small crack indeed, but still a crack that is worthy of attention—namely, a difficulty in promptly getting in the annual payment of the five shillings necessary to constitute membership. This difficulty arises, no doubt, to a large extent from the very smallness of the sum. This might, I think, be readily overcome, and several other benefits conferred on the members generally, by the outlay of a small sum of money.

What I would suggest is this:—That there should be an annual distribution of a print not less than 10 × 12 inches in size, from a high-class negative selected for the purpose, and presented to every member whose subscription had been paid before a certain date—say about Christmas. I have no doubt that the use of a suitable negative might be got for nothing, or rather for the fame which such a proceeding would bring, and the prints, either in autotype or Woodburytype, would cost about twelve pounds. This may be by some considered a large sum out of our small income, but after much consideration I think the scheme would be worth a trial. If it should be considered so, I think there could not be a more opportune time for it to be put in force, as our funds are in a condition sufficiently prosperous, and the negative might be selected from the prints in the forthcoming exhibition.

It is with societies very much as it is with men: in our young days we see the world before us, and start with a resolution to do great things; but with riper years come more limited desires, and too often we are content, or are *perforce* obliged to be, with sufficient for the day.

Some of those present will remember that the founders of the Edinburgh Photographic Society placed before themselves a most ambitious programme, in which were included a large glass house stocked with model apparatus for the use of the members, and a spacious hall in which the meetings of the future should be held. I suppose, however, we have now arrived at the years of discretion, and have no hope, and hardly an ambition, to do more than keep out of debt and do the most we can in each year with the year's income.

I do not, however, wish to be understood as advocating the spending year by year the entire funds of the Society. I have too keen a recollection of the difficulties through which we have more than once passed, and would strongly advise that a sum of at least fifty pounds should be kept at our credit, available in any case of emergency that may arrive. E. R. Yerbury.

FOREIGN NOTES AND NEWS.

The Illustration in the *Mittheilungen*.—Herr Winter's Enlargements upon Iodised Silver Paper.—American Patent Pirates.—Count Ludovico de Courten on Retouching.

The illustration in the *Photographische Mittheilungen* for November is a lichtdruck printed by the Schnell press of Messrs. Brauneck and Maier, of Mainz. The few words of descriptive letterpress beneath the picture were printed, the *Mittheilungen* assures us, in the Schnell press simultaneously with the picture, without the intervention of an ordinary book printing-press. The print before us, the subject of which is a view of the palace of Prince Louis at Darmstadt, is exceedingly delicate-looking, suggesting at first sight a fine line engraving, and the clouds and half-tones are given with a purity and gradation seldom attained by photo-mechanical processes.

For some time back Herr Winter, of Prague, has been exhibiting enlargements upon iodised paper, which have been attracting considerable attention, both at Prague and Vienna, and any authentic details relating either to his process or method of working seem to be eagerly sought after, judging from the fact that a committee or deputation of five gentlemen visited Herr Winter's studio lately, and subsequently published an account of what they saw when there, signed by all five. The company consisted of a notary, two professors at the Polytechnic at Prague, a member of the chamber of commerce, and, lastly, a local photographer, Herr Eckert, whose name is probably not unknown to some of our readers. According to the account of these gentlemen Herr Winter's studio consists of two apartments, divided by a partition wall, into which no direct daylight penetrates, the only window in the first apartment being perfectly closed against daylight by thick curtains.

In the first room electric light, produced by a special apparatus, is thrown upon a lens fixed in the partition wall, and transmitted through the lens falls directly into the *camera obscura* in the adjoining room. In this camera a small *carte*-sized negative portrait of a gentleman was fixed, and at a certain distance behind it, determined by the degree of enlargement desired, a folio-sized sheet of perfectly-white, iodised paper was fastened upon a board. Upon this paper, after the electric light was turned on upon the negative, the enlarged image was visible. After an exposure of five minutes—the length of which the witnesses determined by their watches—the sheet of paper was taken off the board and shut up in a dark box until it was convenient to develope it. The same proceedings were repeated in the case of a second negative, the subject of which was a group of three ladies, except that the exposure only lasted four minutes this time. The two pictures were then laid in separate baths and developed, whereupon the folio enlargements were brought out perfect in purity, distinctness, and strength.

The whole process, from the first turning on of the electric light to the completion of the picture, lasted, according to the observations of the signatories, fifteen minutes in the case of the first picture, and in the case of the second, as the development required eight minutes and the exposure four, the total duration was twelve minutes. The advantage claimed by Herr Winter for his process is that the prints are more chemically durable than ordinary prints upon paper prepared with chloride of silver.

The *Industrien Blätter* repeats the sad but oft-told tale of the state of the patent law in the United States of America, which it yet dubs one of the best in the world. It tells how scarcely a week passes in which a patent is not granted at Washington for some *invention* in (say) chemistry, which, on a close examination, is found to have been taken, more or less truly, from R. Wagner's *Jahrbericht* or the newest number of Dr. E. Jacobsen's *Chemish-technischen Repertorium*, or some similar publication. Remark well the expression "more or less truly," for your re-patentee is too skilful to present a mere bald, literal translation. He sets about the matter so that one could not but think him the most honourable man in

existence, who has done all in his power to enrich the world by his invention.

The new invention that can be most easily pirated is one in the direction of which the author has already made and published researches. In order to avert suspicion the German weights are converted into English, and the totals are multiplied or divided by the same number, and some small changes are made in the details. Though in the example cited the invention is supposed to be pirated from the German, of course English and French journals are equally liable to be rifled in the same manner. Then follows the claim in which the seeker for a patent should describe in a few words what he wishes to patent as *new* in his invention. Here the patent freebooter proceeds in a peculiar way of his own. He relates, first of all, in such learned language what he does not claim as new as frequently to impose upon the examiner of patents and to induce the latter to grant him the desired patent at once.

But, says the *Industrien Blätter*, the reader may ask—"How can this be? Are there not copies of all the more important foreign publications placed for consultation at the Patent Office?" "Oh! yes," answers its correspondent; "but they do not seem to be very carefully read, and then they only reach the office by the slow and roundabout way of being supplied by a bookseller." Now, a bookseller's bale sometimes lies a week or more at the custom-house at New York, and even when the bale reaches him he is not always in any hurry about sending out the contents, so that by receiving his copy direct by post the patent freebooter gets a considerable start of the Patent Office in the matter of information. In conclusion: the writer in the *Industrien Blätter* mentions, amongst the processes which have been patented in the United States under other names than those of the original inventors—lichtdruck, photolithography, and photozincography; but it is quite possible that in this he is mistaken, for many of these new processes and inventions do really spring up almost simultaneously, in different parts of the world, as the result of independent research. And the cause is not far to seek, since they generally supply a known and felt want, which probability would lead one to suppose that several persons would be endeavouring to supply. It need, therefore, astonish no one if, as things gradually develope themselves, several inventors hit upon similar methods of getting over a difficulty, and thus raise conflicting claims of priority of invention; indeed, considering that we are told there is "nothing new under the sun," the wonder would be if these conflicts did not arise. Still there is no denying that in many cases the scientific men and inventors of the old countries have grave cause for complaint of the smartness with which their inventions are appropriated and re-invented in America; but it is very doubtful whether the remedy is so simple as the writer in the *Industrien Blätter* would seem to indicate—the supply of foreign journals to the Patent Office by post.

In *Le Moniteur de la Photographie*, Count Ludovico de Courten has entered into a strong denunciation of the extent to which retouching is carried on at the present day. Several years, he says, have elapsed since he published in the above journal an article on what was then considered one of the chief points in photography, namely, retouching. Since that time he has very seriously studied the question and examined several prints, some of which were worked upon to such an extent as to make them simply ridiculous and destroy all traces of likeness to the original.

The photographic lens produces on the glass a picture of exquisite fineness, in which Nature is dilineated in all her minute details. This image is fixed on the collodion surface, and, with perhaps one or two modifications, it is an accurate likeness of the original. This being the case, why, he asks, is an accurate image of the original so frequently refused by the public? What are its faults? This is answered in a few words. It, to them, has no fine finish and no flattery, which characterise in our days the productions of studios. Some small touches, by way of correction, assist the effects of light and shade in the modelling of the face, and a perfect image furnished by means of the light is the result; but, as usually carried out, this artifice (which does not deserve the name of art) replaces the natural truth, and the result is frequently a caricature.

Photography has arrived at such perfection in respect to its processes that no difficulty exists which cannot be overcome, and a subject can be produced irreproachably when it is cleverly lighted. The generality of people like a portrait having, above all things, a resemblance; the artist, however, likes a fine and artistic copy of the original, and to ensure this he has recourse to retouching, and the more he retouches the more he alters the picture, until he finally frequently takes away all the characteristics of a good resemblance. The less the retouching is caried on the more the portrait is like the original. Retouchers do not suit themselves to special circumstances, but always go on in the same routine manner with every portrait, which results in the destruction of the picture as a likeness. In all studios we find the same kind of thing going on, and each retoucher works upon the negative according to his own idea. As the Egyptians have their rule for human proportions, so have retouchers their rule for retouching. It is a rule with them, among other things, to make the eyes very brilliant, quite irrespective of the fact that the eyes of the original of the portrait may be different in character.

Without requiring too much of the characteristic of a work of art in a portrait, the public certainly attach a primary importance to its being a resemblance, it being for this quality that it is to be prized.

Anyone who can use a brush or pencil knows what a great difference can be effected simply by placing a line or shadow a little above or below where it should be to produce a good effect, and this is a fertile source of the errors which characterise photographs in our days. Although some photographers work up the image to an impossible degree, it must be admitted that there are others who retouch as little as possible, do not modify the results produced by photography more than is absolutely necessary, and still adhere to fidelity and artistic beauty.

Meetings of Societies.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.

The usual monthly meeting of this Society was held on Tuesday evening last, the 12th inst.,—Mr. J. Glaisher, F.R.S., President, occupying the chair.

Messrs. Burrows and Colton having been admitted as members.

Captain Abney, F.R.S., said that, previous to reading his paper on photographic operations connected with the Arctic expedition, he wished to make a brief communication to the members concerning some investigations he had been making respecting sensitive emulsion films. He found that, when making use of a sensitive emulsion that gave only a feeble image, all that was required in order to obtain an image possessing great intensity was that, previous to commencing the development, the surface should receive a coating by any emulsion giving an intense image—a film of albumen or other similar substance being interposed—when, upon applying the alkaline developer, a very intense image was obtained, possessing the special features of both layers of collodion—the rapidity of the former with the intensity of the latter. It had been stated that alkaline development was inoperative where the film had not been acted upon by light; but in the specimens handed round for examination was proof to the contrary, as they showed that an image could be developed upon a film that had never been exposed. He had separated the two films after development and found that both of them contained the image.

Several specimens were submitted to the members for examination.

Captain Abney then read the paper referred to above, and which will appear in our next number.

The Chairman having invited discussion,

Mr. W. England said that, when working in America several years ago, he had encountered a temperature as low as thirty degrees below freezing point. He found that, alhough the cold was so great as to freeze the surface of the wet collodion plates he was using, the quality of the negatives was unimpaired.

The Chairman observed that such pictures as those to which reference had been made by Captain Abney as having been taken at such exceedingly low temperatures must possess great interest to the photographer.

Mr. England said also that he had found no difficulty in obtaining soft and harmonious pictures of subjects containing great contrasts. To secure such harmony he increased the proportion of bromide in his collodion.

A discussion followed concerning the supposed action of the light on the film which was affected as described by Captain Abney.

Mr. Warnerke would like to know the nature of the layer by which the two films had been separated. He asked this in order that it might lead to a conclusion as to whether the action of the light upon the film was chemical or physical—a question upon which light might probably be thrown by means of the experiments recorded.

Captain Abney replied in some observations which we have summarised in an article devoted to the subject in another page. One speaker (Mr. Jabez Hughes) having inquired if the action upon the second film was not analagous to that described by M. Marion as taking place upon carbon paper, Captain Abney said it was quite a distinct action.

After observations by Colonel Stuart Wortley and Mr. T. S. Davis, a vote of thanks was awarded to Captain Abney.

Mr. Mawdsley then read a paper *On a New Method of Working in the Field*, and in illustration of his paper he developed with great success a negative which had previously been exposed.

Mr. William Bedford, who examined the negative and who had watched the operation in the tent, intimated that it was quite successful.

A vote of thanks was awarded to Mr. Mawdsley, an account of whose experiments will be found in another page.

The proceedings then terminated.

EDINBURGH PHOTOGRAPHIC SOCIETY.

An ordinary meeting of this Society was held at 5, St. Andrew-square, on the evening of Wednesday, the 6th inst.

Mr. John Lessels, the newly-elected President, on taking the chair, said that he had some doubt as to what had induced the members to honour him by the appointment of President of the Society. He was sure that there were many in the Society of much larger experience, and who had done much more and better work, than he made any pretension to; but, if in lieu of that they would take a love for the art and a strong belief in its usefulness, he would gladly undertake the duties and responsibilities as well as the pleasures of the office. He heartily thanked the members for the great honour they had conferred on him, and assured them that he would do all in his power to help to keep up the reputation of the Society, and make it what it ought to be—one of the first societies in Great Britain.

The minutes of the previous meeting were then read and approved, and Messrs. John Dick, George Hastie, George Robinson, David Wishhart, and James Rae were admitted members.

Mr. E. R. Yerbury read a paper on *The Aims and Objects of Photographic Societies, with Suggestions for Increasing the Prosperity of Our Own.* [See page 594.]

Mr. Vernon and Mr. Pringle highly approved of the suggestion made by Mr. Yerbury, and thought such a presentation would be of much benefit to the Society.

Mr. Dobie heartily concurred with Mr. Yerbury. The great aim of the Society should be the encouragement of photography, and twelve pounds or fifteen pounds spent on the presentation print from the finest negative that could be obtained would not only help to do that, but would also add to the popularity of the Society.

Mr. Sinclair was glad to see that the idea of accumulating money to build a hall had been abandoned, or, indeed, the idea of accumulating money for any purpose. So long as they kept a balance at the bank of forty or fifty pounds he thought that the annual income should be extended on the work of the Society, and he was sure that the annual presentation of fine prints would be a move in the right direction.

Dr. Thomson had some doubt as to the benefit likely to be derived from the suggested presentation. His own belief was that the work or true aim of the Society should be more practical, and that a large membership was really of less importance than that all should be real workers.

Mr. Tunny agreed with Dr. Thomson, and thought that the scientific and technical aspects of photography should receive much more attention. The great object of the Society should be the production of good practical papers on those subjects, and he thought some money might be well spent in giving medals or cash inducements to first-class men to bring them before the meetings.

Mr. Macbeth seemed to think it well to begin at home, and suggested that the work of the members should be brought to the monthly meetings and critically examined, and that such as were of superior excellence might be bought either for the album or for distribution.

Mr. Annan did not see that the Society should be turned into an art-union, and thought much more good might be done by spending a portion of the funds on the promotion of social meetings.

Messrs. Douglas, Turnbull, and others indicated approval of the proposal, and it was remitted to the Council to consider and report.

Several questions from the box were then discussed, the most interesting being—"What is the best method of printing from a broken negative?" Various methods were suggested, probably the most satisfactory being that proposed by Mr. Bow—to cement the pieces to a plate of glass with Canada balsam, taking care that the broken edges were brought into optical contact by the balsam.

Mr. Tunny said that he succeeded admirably by arranging the broken pieces on a plate of glass the size of the negative, film side up, and then floating a piece of the albumenised paper, face up, on water till it became tacky, and pressing it firmly against the negative. The paper should be large enough to fold over for a quarter of an inch on the opposite side, and it would, as it contracted on drying, so bind the broken parts together that in suitable light prints might be got quite free from any indication of the fracture.

A number of very fine photographs, contributed by Mr. James Howie, were then balloted for.

Lieut. Gilbert laid on the table for inspection a volume of excellent photographs, taken during the recent voyage of the *Challenger*, which were much admired.

After the usual votes of thanks the meeting was adjourned.

GLASGOW PHOTOGRAPHIC ASSOCIATION.

A meeting of the Glasgow Photographic Association was held in the Religious Institution Rooms, on Wednesday, the 6th instant,—the President, Mr. John Stuart, in the chair.

After formal unanimous admission of three new members,

The President, in introducing Mr. John Henderson, of Perth, to the members present, said they must have heard and read of that gentleman, though they might not have had the pleasure of being previously personally acquainted with him. The subject of Mr. Henderson's remarks would be on that important branch of their art called *Retouching* [see page 593], and it gave him much pleasure to ask Mr. Henderson to read his paper.

Mr. Urie considered Mr. Henderson's paper an able one, but would have preferred it had it been of a more practical character. Of the two enlarged pictures Mr. Henderson had been kind enough to bring with him he preferred the untouched one, and thought it much superior to the retouched and highly-modelled example. To his mind the untouched one had a beautiful grain and texture, and gave an indication of qualities not observable in the modelled picture. When enlargements were wanted it was his (Mr. Urie's) experience that it was much better to take them from unmodelled negatives, or, if that be not forthcoming, from a print of a negative which had never come under the retoucher's pencil. He remembered having a large oil painting to execute from a *carte*, the negative from which it had been printed having evidently been excessively modelled. He told his client that it would not bear enlarging very well, but was requested to go on with the order. When enlarged it did not look like a human face, but like a large turnip—so much so, indeed, that he felt certain had a calf strayed into his premises, and seen the production, it would have taken it for such. In large pictures smoothness was not wanted, and altogether, but more especially in enlargements, retouching was to be deprecated. Mr. Urie then showed an ingenious mechanical method by which the retoucher could be greatly assisted in his work, without fear of losing the likeness, which consisted of an elastic stamp with an impression of dots or lines on it. This stamp is made with glue, some sugar, and pigment.

Mr. White entirely agreed with the sentiments Mr. Henderson had expressed.

Mr. Robertson said that Mr. Henderson in his opening remarks stated that writing papers for photographic societies was not in his line, and that before he finished he expected to prove this to his audience; but he (Mr. Robertson) thought he had proved to the contrary—that, indeed, he was well able to write papers. He could agree with Mr. Henderson's teaching. Against legitimate retouching nothing could be said; but he could not inveigh too strongly against the almost universal illegitimate use of the pencil and the brush on negatives at the present time. He was sure there were many negatives taken needing no modelling whatever, but under the modeller's hands the likeness was lost, which he considered a grievous mistake. As to negatives such as he (Mr. Robertson) had alluded to, seeing that as photographs they were true to life, nothing should be done if it could possibly be helped. He could hardly call those negatives that were so highly modelled anything but cheats, all the lines giving character to the face being entirely swept away. No! Let us have the untouched picture with the story of life plainly written upon the sitter's face, whether it be lined, scarred, and marked, as those showed the care, the trials, and the hard-fought struggles of life which all have to come through. If they could possibly get a negative of Shakespeare, would they like it modelled? No! he was sure they would not. Not a line would they care about losing in his face. Of the two pictures Mr. Henderson had brought with him he considered the untouched one worth a thousand of the touched specimen. In fact, he could not at all look upon modelling in the way Mr. Henderson had spoken of it. He remembered once having been shown by a friend a cabinet photograph he recently had taken, and was asked his opinion of it. He replied that it was very beautiful as a picture, and splendidly worked up, but that as a likeness it was not to be compared to a full-length that had been taken of him by himself (Mr. Robertson) some time previous, in which opinion his friend entirely agreed. In all cases he should like photographs to be truthful portraits—not fancy pictures.

Mr. Dodds considered that retouching in the main could scarcely be upheld, but thought that prints from many untouched negatives would be no truer likenesses than those from over-touched ones—the former showing too plainly (more so, in fact, than is observable upon the subject's face) any little blemishes, freckles, and marks. He endorsed Mr. Henderson's remarks, advocating, as he did, the legitimate, and not the illegitimate, use of the pencil. It was all very well for old photographers to say that their positives and daguerreotypes of long ago showed no blemishes, but they must take into account their very small size generally, defects thus not being so easily seen; but he contended that large glass pictures *were* as defective, and more so, than the negatives of the present day. Of the two enlargements Mr. Henderson had shown, he also thought there was more character seen in the untouched than in the touched specimen.

Mr. Gilfillan thought the subject of retouching was altogether a question of art, ability, and taste, and that it was quite in the power of any artistic retoucher to give all in the original. He considered that untouched pictures displayed more intellect and character. To all it was obviously seen that a certain amount of retouching could not be done without, but it should not be carried any further than needful. Some one had remarked that the public must have them finely modelled,

and that if they did not thus please them they would inevitably lose their means of living. He thought they should not altogether pander to the tastes of patrons, but rather try and educate them to admire what was true. Modelling gone over the score he considered unjustifiable. They should be as true to nature as they possibly could.

The President imagined that some of the members had misunderstood his remarks on retouching in his opening paper read at the last meeting, and thought he did not retouch his negatives. He never confessed to non-retouching, but said it should be condemned. What he should like to see introduced would be some means of producing pictures devoid of harshness, and requiring little or no modelling. As a collodiotypist in days gone by he might say the pictures he produced then required no retouching, nor did any of those beautiful productions of the pearly days of the art. Daguerreotypes did not require any, and he thought it their duty to strive to reach a step higher than they now stood, and endeavour to invent some means of producing negatives needing little or no retouching, and which would give beautiful, soft prints pleasing to the public. He thought Mr. Henderson had not shown his usual candour in regard to the two specimens of portraiture enlargement he had brought with him. One of them was in silver and the other in carbon, the silver one labouring under the disadvantage of being the unmodelled specimen. Now, if Mr. Henderson had printed that untouched print in carbon it would have looked vastly superior to what it did in silver, and they would have been enabled to give a clearer judgment upon the two. He felt certain that if a phrenologist were given his choice of the two from which to form a knowledge of the man's character, he would prefer the untouched to the touched portrait. In all cases no more modelling should be put upon the face of the sitter than was necessary, though a good deal of touching up of a quite legitimate kind could be done in many instances upon the background and surroundings, by which a little effect could be introduced and the portrait thrown out in more relief.

Mr. Henderson said that, in eliciting from the members such a pretty general expression of approval and disapproval, he considered his paper had served the purpose for which he wrote it. He deprecated as much as any of them the excessive use of the pencil or brush, but could not at present see his way to do without them altogether, though he should be only too glad to try any suggestions that might ultimately supplant them. In all negatives he considered a certain amount of touching up was required, yet it should be the earnest desire of every photographer to produce negatives as free from blemishes of any kind as possible and that would require no modelling. He was quite well aware that the untouched silver print he brought with him would have looked much better if printed in carbon; but as to the talk of more character being observed in it than in the touched one it was all "moonshine," as, being personally acquainted with the gentleman, he was in a position to state that the modelled one was the truer likeness of the two, and much more characteristic altogether.

The President proposed a hearty vote of thanks to Mr. Henderson for his paper.

The Secretary seconded the proposal, and thought the Society was doubly indebted to Mr. Henderson for preparing such a paper and for coming all the distance to be present.

A vote of thanks to the Chairman concluded the meeting.

WEST RIDING OF YORKSHIRE PHOTOGRAPHIC SOCIETY.

The ordinary meeting of the above Society was held at the Commercial Hotel, Bradford, on Monday, the 4th instant,—Mr. Smith, the President, in the chair.

The minutes of the previous meeting having been read and confirmed, Mr. Suddick was elected a member of the Society.

The Secretary read a paper on *Albumen* [see page 593], being a communication from Mr. Clark.

Mr. Sachs said that he had used plates coated with a substratum of albumen for years, and he entirely differed with Mr. Clark. On the subject of albumenised plates injuring the bath he had never had any failures with them, and he did not clean the backs except in the case of very large plates.

Mr. Smith (Leeds) stated that he had been for some time using dried albumen for making the solution, and had found it to be equal to the fresh albumen from new eggs.

Mr. Howarth was of opinion that, for amateurs, albumenising plates was not advisable. He had found that albumenised plates would not keep any length of time, and that he could clean the plates he wanted quicker and more certainly than he could albumenise them. He had coated plates with albumen and laid them aside for a month, and on using them found them entirely worthless. Cleaned plates under similar circumstances were successful.

Mr. Smith (Halifax) had met with similar experiences as those referred to by Mr. Howarth.

Mr. Wormald spoke favourably of the use of albumen. His long exposures—often one to two hours—compelled him to use it; otherwise, in the after manipulations, the film rose. He was of opinion that the albumen had no deleterious effect upon the nitrate bath, and he wiped the backs of none except 26 × 21 plates. If his plates were albumenised he always felt certain of the result. It was often his lot to work under disadvantageous circumstances. He remembered on one occasion, when in the north of Scotland, having used up his stock of albumenised plates, and, being many miles away from any town, he had to content himself with rubbing them with a cloth dipped in nitric acid kept for bath purposes, rinse them under the water of a mountain spring, albumenise, and dry out of doors, and the plates were equal to anything he had done. As to the film sticking on the plates, on one occasion, when photographing machinery, in Wiltshire, he washed his plates under the hose-pipe used for washing the engines—a force that would have completely washed off the film from a simply-cleaned plate.

Mr. Smith (Halifax) remarked that some samples of collodion stuck better to the glass than others. He had some that could scarcely be rubbed off.

Mr. Greaves thought that if Mr. Smith's bath were acid he would not find the collodion stick.

Mr. Smith replied that as he used Black's acid formula for his bath Mr. Greaves's remarks could not apply.

After some further observations the subject of albumenising plates was dropped.

Mr. Greaves remarked that, if Mr. Clark's statement that a high gloss on paper was secured by the use of albumen which had undergone fermentation was correct, it was probably the reason of the want of permanency so much complained of, and which was attributed to the albumen.

Mr. Smith said that Mr. Cherrill, in a recent communication to one of the journals, corroborated that statement.

The meeting then became of a conversational character, and was shortly afterwards adjourned.

BRISTOL AND WEST OF ENGLAND AMATEUR PHOTOGRAPHIC ASSOCIATION.

The ordinary monthly meeting of this Society was held on Wednesday evening, the 6th inst., at the Museum, Queen's-road, Bristol,—Lieutenant Lysaght in the chair.

The minutes of the previous meeting having been read and confirmed, Mr. H. A. H. Daniel proposed the Rev. F. T. Salmon and Surgeon-Major Mantell, M.D., both of Honiton, as corresponding members, their election forthwith taking place.

The Chairman then called upon Mr. E. Brightman to read a paper advocating *Iron as an Intensifier*. [See page 592.]

The Secretary then read a communication from Mr. H. Manfield, of Northampton, a corresponding member, in which that gentleman advocated the use of iron for intensification for six reasons, viz.:—Because intensification was with its use more under control; it gave greater freedom from fog and stains; required much less washing of the plate prior to its use than did pyrogallic acid; the solution improved by keeping, whereas pyro. deteriorated; its far less cost than pyro.; and its greater portability in a dry form. The writer stated that he had entirely discarded the use of pyro. as an intensifying agent, and had never once regretted doing so. His experience was not so extensive as that of some amateurs, but what he had stated he had found to be the case.

Mr. Brightman handed round some negatives and transparencies intensified with iron.

Mr. Daniel likewise did so, and remarked that it had been stated that iron had a tendency to "block" the shadows in a negative during intensification, but on that point he was hardly prepared to affirm that, of pyro. and iron, either had a greater tendency than the other to do so, but that, taking other matters into consideration, he felt he must certainly advocate iron in preference. He almost invariably used it till he heard it spoken against. When going through North Wales last summer he used pyro. to test the two methods, but found no reason for giving up iron. He differed much from Mr. Manfield in the question of portability, failing to discover that iron was more portable than pyro. He exhibited a transparency, one-half of which was intensified with iron and the other with pyro., the only apparent difference being a slightly-extra degree of softness about the half intensified with pyro.

Mr. Brightman remarked that it was hardly a fair way of testing the two modes, as the character of one half of the transparency might slightly differ from the other. A stereoscopic picture would be better.

The Chairman remarked that he had often found very clearly-shown fine lines in a negative (such as wires or ropes) which he could scarcely detect in focussing, and he always used iron, thereby showing that there was no "blocking" apparent.

Mr. Holt also strongly urged the claims of iron over pyro.

The Chairman then exhibited two negatives by the gelatine emulsion process developed by his new mode, viz., with *hot* solutions and soaking after using pyrogallic acid on the surface, the full particulars of which appeared in The British Journal of Photography a fortnight ago. He remarked that the sensitiveness was greatly increased and blisters were entirely avoided.

After some further discussion the meeting concluded with a vote of thanks to Mr. Brightman for his paper and to the Chairman for presiding.

PHOTOGRAPHIC SOCIETY OF FRANKFORT-ON-MAINE.

This Society held its first annual general meeting on Monday, October 23rd,—Herr van Bosch in the chair.

The President made some remarks to the effect that, like all first steps, the foundation of their Society had been surrounded by difficulties, but that as time went on they had experienced in some measure the truth of the proverb—"*Ce n'est que le premier pas qui coute.*" He greeted the guests present, absent friends of the Society, and the new society of Cologne, wishing it all prosperity in the name of the Frankfort Society. He then thanked the office-bearers, especially the Secretary, Dr. Schleussner.

The Secretary read the annual report, which may be briefly summarised as follows:—At the first meeting, November 1, 1875, the roll consisted of 44 members; it now numbered 92 members residing in all parts of Germany. In the course of the past year the Society had held eighteen meetings, at which a number of interesting papers had been read and productions exhibited. It had established an organ of its own and a travelling album. In conclusion: the Secretary expressed a hope that the second year of the Society might be at least as prosperous as the first, and that the ground already conquered might be diligently cultivated.

Herr Maas, the Treasurer, then reported on the finances, whereupon the meeting proceeded to the choice of office-bearers, when those then in office were re-elected. A telegram of greeting from two absent members was read, after which the meeting adjourned to supper, and the first anniversary of the foundation of the Photographic Society of Frankfort-on-Maine was celebrated with many toasts and songs.

Correspondence.

CHROMOPHOTOGRAPHY.

To the Editors.

Gentlemen,—Mr. E. Stebbing, in his last communication to you, alludes to some chromophotographs having been exhibited by M. Rousselon at the last meeting of the Photographic Society of France, and, after mentioning the fact of my having exhibited a similar example at the South London meeting, goes on to say:—

"This system was very ingenious, but a loss of time was occasioned by being obliged to print from six stones if half-a-dozen colours were required. A gentleman at Hamburg, said M. Rousselon, had the idea to make a kind of mixture of each colour," &c.

Allow me, therefore, to correct Mr. Stebbing so far as to say that the first example of this method ever made—the one in question—was not printed from six or more stones, but was prepared for me by the gentleman at Hamburg, and in the same manner as that described at the meeting referred to.

The process being at that time secret prevented me from explaining the method by which the under-print was obtained.

Mr. Stebbing may (if he will be so kind) intimate to the Photographic Society of France, at their next meeting, that I hope shortly to present to the members samples of this method, which I have been working to perfect during the present year.

I enclose you the under-print in question, made for my process by M. Otto Radde, of Hamburg, more than twelve months ago, and which formed the groundwork of the picture exhibited at the South London Photographic Society.—I am, yours, &c.,

December 9, 1876. Walter B. Woodbury.

[We are preparing an article on this subject, which will appear in our next number.—Eds.]

PHOTOGRAPHIC FACTS AND FANCIES.

To the Editors.

Gentlemen,—It has often occurred to me that, if some of your able correspondents would occasionally contribute papers detailing a few of the numerous incidents of an instructive or amusing character which they must often have met with during their professional career, it would tend to make the Journal a still more welcome visitor amongst us, as an opportunity would thus be provided for the ladies and juniors of our family circles to obtain a little pleasure from the same source which affords us so much.

Take, for instance, the letter from Mr. Ferranti which appeared in a recent issue. It is full of interest, and is, moreover, well calculated to awaken in the minds of the young feelings of respect and veneration for the aged.

I well remember a similar circumstance which happened in my own experience many years since, when I also had the honour of photographing a dear old lady of the mature age of one hundred and seven years; and, let me add, that after I had taken the photograph the old lady very pleasantly and good humouredly implanted a hearty kiss on my cheek, at the same time invoking the blessing of heaven upon me. I do not know if Mr. Ferranti was similarly honoured, but I flatter myself there are but few who can boast of having received a centenarian's kiss.

I was referring to the circumstance, perhaps a little proudly, a few years afterwards, at a small festive gathering, at that particular season of the year which brings perseverance into a more than usual state of effervescence, when a winking wag, who was one of the party, took the wind quite out of my sails by drily remarking that it was all very nice no doubt, but for his part he would much prefer receiving the same tender impressions upon his cheeks from the lips of the "eighteenarians" then present than from any centenarian living. Saying which, he cast a sly look towards the mistletoe bough which was suspended from the ceiling. Of course, I said no more, but simply "dried up."—I am, yours, &c., W. Cobb.

Woolwich, December 11, 1876.

THE LATE PHOTOGRAPHIC EXHIBITION.

To the Editors.

Gentlemen,—Your "Occasional Contributor's" diffidence was not misplaced—in fact, it is a pity it allowed him to waste paper. As I am not so diffident I will try and say what I mean without apology and in my own name. Surely the remarks of a visitor who writes under a *nom de plume* are hardly worthy of type, for they do not carry the recognised weight of the Journal's criticism, nor that of an individual who may be known in the art world.

The "Occasional Contributor" has ventured to suggest to a distinguished corps to which I have the honour to belong that by tilting the camera they have spoilt a fine subject in the *Cobbler's Palace.* I will not refer again as to what Royal Engineers were the producers of this picture, but will at once state that the camera was not tilted. O critic! for shame not to be able to distinguish between distortion produced by a camera and that by time! As regards his other criticism on the pictures sent in by the Royal Engineers, I am not ashamed to confess I placed the offending figure, and, unless "An Occasional Contributor" prove to be a Royal Academician tired of publicity, I shall hold my own opinion against his as to the correctness of its position.

Finally: Mr. Editors, your "Occasional Contributor" has lavished abundant praise on a picture in which the clouds were turned upside down. Why, this is worse than nature's tilt given to the *Cobbler's Palace!* On the whole, I think "An Occasional Contributor" owes to the Royal Engineers an apology for maligning them, to myself thanks for writing this letter, and to himself a determination not to undertake a duty for which he is evidently unfitted.—I am, yours, &c.,

Chatham, December 12, 1876. W. de W. Abney, *Capt. R.E.*

WHITE FRENCH POLISH.

To the Editors.

Gentlemen,—Can you, or any of your correspondents, inform me where I can obtain good *white* French polish? Or give me a good formula for the same, as well as directions for its use.

The object I have in view is to polish white wood on which carbon prints have been transferred, as there are many purposes to which such a process might be applied and produce some very charming results.—I am, yours, &c., Henry Cooper.

Homehurst, Torquay, December 9, 1876.

[We, too, and many others besides Mr. Cooper, would like to receive information on this matter; and, as we are aware that French polish of this kind is made, we join Mr. Cooper in asking for such information respecting it.—Eds.]

DEEDS OF PHOTOGRAPHY.

To the Editors.

Gentlemen,—I presume to offer one correction and one addition to Mr. Wall's interesting communication, in your last number, on the extensive and extending uses of photography.

One agent in popular education is the sciopticon (the high-art designation of the magic-lantern). I saw, the other evening, a set of slides projected upon a large field illustrating the Nile. The wonders of Egyptian antiquity were as actually present to the spectators as the objects themselves would have been; for, although diminished, by the aid of photography every object was actually there—from the Titanic Pylone and gigantic monolith to the smallest figure in the elaborate tomb-paintings and mural sculptures. These were all coloured after reality. This, to ambitious photographers, may not seem a very elevated application of their beloved art; but its power in providing amusement and instruction together for many people is incalculable.

Now for the correction. Mr. Wall mentions the inability of the "old" wood-engravers to translate tint into line. It is, in fact, the modern school of that art which were (before photography) slaves to *facsimile.* The immediate successors of Bewick, Branston, Nisbett, Thurston, and their contemporaries worked upon drawings, outlines in pencil, and tinted with washes of india-ink of various shades. Thus they had to consider how, by means of lines, these shades could be

preserved—not only the shades, but the forms; not only the strength of line to be cut, but the shape and inclination of line. I believe that Harvey drew his celebrated "Denlatus" block in that way, and engraved it in lines invented as he went on. I believe it was Harvey himself who, finding his tints miserably translated into print by other engravers, introduced the system of tying the operative (for really that is the true name) down to the reproduction of every line he drew.

Blessed, therefore, be photography, for re-introducing thorough and real art into the process of relief engraving! and thanks to Mr. Wall for his suggestive communication!—I am, yours, &c., W. H. W.

December 12, 1876.

P.S.—Talk of the "Deeds of Photography!" There is not a single science which it has not benefited, either by the figuring of objects, or by recording results. In astronomy and optics, for example, the spectroscope would have few practical uses without it.—W. H. W.

EXCHANGE COLUMN.

No charge is made for inserting these announcements; but in no case do we insert any article merely *offered for sale*, that being done at a small cost in our advertising pages. This portion of our columns is devoted to exchanges only. It is imperative that the name of the person proposing the exchange be given (although not necessarily for publication, if a *nom de plume* be thought desirable), otherwise the notice will not appear.

I will exchange a Ross or Voigtlander *carte* lens for Moulton's washing machine.—Address, W. S. B., 103, Newgate-street, E.C.

Will give Bateman's metal fire, new, in exchange for Bigelow's album, complete.—Address, F. M. Sutcliffe, Whitby.

I will exchange enlarging lantern with five-inch condenser (perfect), blow-through, and mixed gas jets, screw adjustment, for 12 × 10 Ross's new symmetrical lens and studio chair with changeable back.—Address, Photo., 81, Malden-road, London, N.W.

ANSWERS TO CORRESPONDENTS.

☞ *Correspondents should never write on both sides of the paper.*

Notice.—Each correspondent is required to enclose his name and address although not necessarily for publication. Communications may, when thought desirable, appear under a *nom de plume* as hitherto, or, by preference, under three letters of the alphabet. Such signatures as "Constant Reader," "Subscriber," &c., should be avoided. Correspondents not conforming to this rule will therefore understand the reason for the omission of their communications.

G. Ekralc.—There are about thirty-four ounces in a litre.

Boss (Clerkenwell).—Chloride of copper may be obtained from any of the drysalters in your neighbourhood.

T. J. P.—Thanks. You will be glad, however, to learn that we have already received a specimen executed by aid of the process.

An Amateur.—The prints should be mounted with stiff glue. The addition of two or more drops of carbolic acid to the gelatine will prevent the decomposition of which you complain.

C. J. W. (Manchester).—If the image be formed of asphaltum or bitumen it will form an etching ground that will resist the action of nitric acid. To form such an image is not difficult.

J. T. R.—1 and 2. We have no knowledge of the solution in question beyond that imparted in the article, which was translated from a foreign source.—3. After the publication of the Almanac.

Cygnus.—Apply tincture of iodine to the spot, following the application with a strong solution of cyanide of potassium; and for this purpose the cyanide must be of the strongest quality that can be procured.

Inquiry.—Although any good landscape lens will answer your purpose if used with a tolerably small stop, it is better that one of the now numerous family of non-distorting lenses be selected for the purpose.

A. G. T.—By evaporating the silver solution your end will be gained in a better manner than if you have recourse to frigorific mixtures. These are excellent for some purposes, but not for that described by you.

S. M. L.—1. Provisional protection can be obtained for six months; but with this exception no protection is granted for inventions for any other period under three years.—2. The patent for the graphotype is still in force.

Insensitive Markings on Plates.—Without desiring to anticipate what is to be fully elucidated in the forthcoming Almanac, we may yet state that as a subject of passing interest Mr. Crowe has, in our estimation, "hit the nail on the head" in a theory, backed by plain experiments, which he has advanced. It relates to a search instituted by him into the cause of these insensitive markings and how he discovered it. For full particulars we must refer to the Almanac, but, *en passant*, we may observe that the holder is mainly implicated in this matter.

C. Mitchell.—To keep your burnishing rod clean make use of a piece of soft wood charged with fine polishing powder, which you can obtain at the establishment of any dealer in requisites for cutlers and watchmakers.

B. Solomons.—We do not think it either libellous or actionable when Mr. ——— advertises that his portraits are the finest taken in your particular district, because that would be considered by the judge as a mere piece of trade puffery. It is open for you to advertise also, and rate your own productions as being, by inference, *very* far superior to those of your rival. Do this at once, if you can do so conscientiously.

Medicus.—In order to ascertain if the want of marginal sharpness be owing to astigmation or merely to roundness of field, test the lens for the former by focussing any object in which there are bold vertical *and* horizontal lines. Examine the image with a powerful magnifier, and, from its appearance, the cause of the want of sharpness and the exact amount of astigmation will be ascertained. The best eyepiece for this purpose is one of the combination form, such as that of a small terrestrial telescope.

T. P. (Bristol.)—Assuming that the bath is to be formed of wood, an excellent means to protect it from the action of silver is to melt together equal parts of white wax and paraffine and brush it well over the surface of the wood. Heat must then be applied so as to raise thet emperature of the surface of the wood, by which means the composition will penetrate its pores. After such penetration has taken place give the surface a final coating of the mixture, and when cold it will be impervious to the silver solution. A hot iron forms an effective mode of applying heat to the surface of the wood.

G. Pocock.—The green colour of the nitrate of silver is owing to the presence of copper. It is probable, although you have not said so, that you have made your nitrate from ordinary sterling silver, such as coin or spoons, and if so this will at once account for the greenish tint. Such a small amount of copper will do no harm, but you may get rid of it by various methods, one of the simplest consisting in fusing the crystals in a clean porcelain vessel, by which means the copper will be oxidised and form a black insoluble body. When the nitrate is again dissolved in water the copper will be found at the bottom.

Jasper.—One of the easiest methods by which to produce a drawing of a photograph in lines is the following:—Let the photograph be printed on plain paper, and fixed with hyposulphite of soda, taking care that it be not toned. Now by means of a strong black ink, and a finely-pointed steel pen, trace first the outlines of the picture, afterwards filling in such details as may be necessary. When the whole of the picture has been gone over in this way, immerse it in a solution of bichloride of mercury, by which the photograph will be made to disappear, leaving the pen-and-ink drawing alone visible. From this drawing take a negative, and it will then be a very simple matter to produce from it a surface printing block.

☞ Editorial Communications should be addressed to "THE EDITORS"—Advertisements and Business Letters to "THE PUBLISHER"—at the Offices, 2, York Street, Covent Garden, London, W.C.

Forthcoming Photographic Exhibition at Edinburgh.—We understand from our Edinburgh correspondent that the arrangements for the forthcoming Exhibition in that city are progressing satisfactorily, but that in consequence of the unexpectedly large number of exhibits the opening will not take place till the 20th inst.

OUR ALMANAC.—Our business friends who have not yet sent in their Advertisements are requested to do so before Monday, the 18th inst., up to which time a few more pages of Advertisements will be received.

METEOROLOGICAL REPORT,

For the Week ending December 13, 1876.

Observations taken at 406, Strand, by J. H. Steward, Optician.

These Observations are Taken at 8 a.m.

Dec.	Bar.	Wind.	Wet Bulb.	Dry Bulb.	Max. Tem.	Min. Tem.	Remarks
7	29·16	SE	47	48	53	45	Raining
8	29·48	NE	47	49	50	47	Dull
9	30·13	NW	39	40	49	38	Hazy
11	30·14	NW	42	46	48	43	Foggy
12	29·79	SW	42	44	49	43	Dull
13	29·84	W	37	39	46	36	Dull

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THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 868. Vol. XXIII.—DECEMBER 22, 1876.

THE RELATIVE PROPORTIONS OF THE SOLVENTS AS AFFECTING STRUCTURE.

We received, a few days ago, a letter from a gentleman whose name is well known in our columns, complaining of a difficulty he has experienced in obtaining even and structureless films with certain emulsion processes. From our correspondent's description of the defect it appears that, though the greater portion of the film is free from structure, "the upper portion, where the emulsion was first poured on, shows marks of reticulation, no matter how much the plate may have been rocked." This fault he attributes to the unsuitable proportions of ether and alcohol employed in the emulsion, and suggests that we should make this the subject of an article—a suggestion we are very happy to carry out.

The matter, however, is not so simple as would at first sight appear to be the case; for, in addition to the two conditions mentioned by our correspondent—size of plate and temperature—there are other considerations which conduce to render somewhat indefinite or uncertain the "best" proportions of the solvents necessary to produce a given description of film. Thus, to enumerate a few of the conditions, we may mention the nature of the pyroxyline, the salts used in bromising and their quantity, whether free bromide or free silver be in excess in the emulsion, and whether the latter be an ordinary collodio-bromide or a washed one. Then, again: the very nature of the solvents themselves forms one of the most important sources of difference according to the proportion of water contained in them, so that it may be easily understood that to draw a hard and fast line, or to give a formula to be used under certain conditions as to size of plate and temperature, is simply impossible. Our course, therefore, will be to describe the manner in which any alteration in the various conditions, if made singly, would affect the result, and so lay down a series of general rules which may be useful as a guide under all circumstances, leaving to the judgment of the operator the working out of the correct proportions.

In the case of collodion for employment with the bath the proportions of ether and alcohol most generally recommended and used are equal parts; these proportions are to a great extent adhered to irrespective of other conditions—such as the nature of the pyroxyline, the character of the salting, and frequently the quality of the solvents—though when working in a high temperature, or upon large plates, it becomes necessary to modify the formula to some degree. In the case of collodion, however, the circumstances are greatly altered; it is a clear solution, and, provided the cotton be of such a character as to flow smoothly on the plate, there is little else to interfere with the good quality of the film, unless, indeed, unreasonable liberties be taken with the other materials. An emulsion, however, contains, in addition to the constituents of the collodion, an insoluble substance in suspension which, as may be supposed, entails infinitely more trouble, and renders it needful to exercise greater care and attention in the arrangement of the different minor conditions, which all act their part in bringing about a successful issue. Since the introduction of emulsions it has been customary to adhere too strictly to the same proportions of the solvents, without giving a due amount of attention to the minor matters, and though probably in very many cases the attendant circumstances are sufficiently near the correct state to produce no ill effect, it is plain from the numerous complaints which arise in all quarters that some reform is necessary in the formulæ for emulsions.

The parts played by ether and alcohol respectively in dissolving pyroxyline are in a certain sense equal, inasmuch as neither, *per se*, is capable of effecting solution, though the admixture of a very small proportion of either is sufficient to produce that result. Ether alone certainly exercises a partially solvent action, reducing the pyroxyline to the state of jelly, but producing no real effect of solution. Alcohol also is stated to dissolve some descriptions of pyroxyline; but we consider it extremely doubtful whether such solution is really due to the alcohol itself or to the accidental presence of slight traces of ether. However that may be, it is quite certain that with *ordinary* pyroxyline and *pure* ether and alcohol a mixture of the two liquids is absolutely necessary to produce solution, and a comparison of a sample of collodion in which the ether greatly preponderates, with one in which the conditions are reversed, will establish the fact that the solvent action is widely different in the two cases. With a preponderance of ether the collodion will be gelatinous and transparent with a tendency to "lumpiness," while with alcohol in excess it will have a smoother consistency and a slightly opalescent appearance almost amounting to granularity. From this it may, perhaps, be deduced that the solvent action of the mixture is mainly due to the ether, while the function of the alcohol would appear chiefly to give fluidity to the solution. By a judicious application of these principles (due attention being at the same time given to the accompanying effects produced by the difference in the volatility of the two liquids) considerable variations in the properties of the solution may be secured; indeed, it may be said that, *cæteris paribus*, every alteration in the proportions of the solvents produces a collodion possessing distinct characteristics, and liable to further modification by other disturbing causes.

The first element which enters into consideration is naturally the pyroxyline, upon the quality of which, in fact, depends mainly the character of the resulting film; but as it may be presumed that, at the present day, little difficulty need be experienced in procuring it of good quality, at least as regards its physical properties, we may almost omit it from the list of causes of variation. There are, however, samples of cotton equally good in all photographic respects, but differing widely in solubility and freedom from structure; and, in order to bring the more refractory descriptions into the most perfect working condition, it is frequently advisable to vary slightly the proportions of ether and alcohol. Thus, with a sample possessing a low degree of solubility, a full proportion of ether should be used, while with the more soluble kinds, made at a high temperature, or with the organic cotton made with gelatine, the alcohol may preponderate. This rule holds equally good whether the quantity of cotton per ounce of solvents be four or eight grains, as the effect produced by a badly-proportioned mixture is not to limit the quantity of cotton it will dissolve, but to lower the fluidity of the resulting collodion by reason of its imperfect action. It is, in fact, quite possible that a given mixture of ether and alcohol may be capable of dissolving eight or ten grains of a certain description of cotton, and give a

collodion wanting in fluent properties, while, at the same time, if only half the quantity of pyroxyline be dissolved the collodion, though thinner, may exhibit the same viscidity and disinclination to run smoothly on the plate as is noticeable in the other case, the inference being that the ether and alcohol mixture in those proportions does not form a perfect solvent for that particular class of cotton, but leaves it in a more or less gelatinous state. Abnormal viscidity arising from this cause must not be confounded with a somewhat similar defect produced by merely overloading the solvents with cotton; the two are easily distinguishable from the fact that in the latter case the evil disappears upon the addition of a sufficiency of the same mixture of solvents.

Another disturbing element exists in the different salts used in iodising or bromising—some salts, notably those of cadmium, showing a strong tendency to gelatinise the collodion; others, again, of which the salts of magnesium may be taken as the type, producing an opposite effect. Undoubtedly the best means of overcoming the former fault is to allow the collodion to acquire age or ripen, when the viscidity and structural defects disappear; but circumstances frequently arise to render such a course inconvenient or inexpedient. In such instances, and where it is not possible to mitigate the evil by the employment of a sample of pyroxyline suited to the particular formula for iodising, something may be done by varying the relative quantities of ether and alcohol. Some care is necessary in applying the remedy, which consists in slightly increasing the proportion of ether; for if too large a quantity be used the increased volatility of the collodion will render it unmanageable by causing it to set too rapidly. If the collodion, in the first instance, be too fluid from the employment of magnesium salts, the rapid setting powers conferred by excess of ether become valuable; for the collodion being extremely thin and limpid it is possible to secure an even film over the whole plate before the upper portions commence to set. The magnesium salts, particularly, seem to possess a very decided action in retarding the setting of the film, hence in such cases the aim should be to increase the quantity of the more volatile solvent as far as possible without lowering the fluidity of the collodion sufficiently to produce irregularity in the resulting film.

So far we have assumed that the solvents used are as free from water as possible; but if they should be of a comparatively low grade, a very great modification of the results will ensue. It is, perhaps, not really necessary to employ ether and alcohol of the very highest strength, as a considerable quantity of water may be introduced into the collodion without producing any ill effect; indeed, it is frequently recommended to add water in order to bring about certain changes of a beneficial character. Moreover, absolute alcohol and ether of the s. g. ·792 are considerably more expensive than other samples differing but a very few degrees in density, while for all practical purposes alcohol and ether of the respective specific gravities of ·810 and ·730 are quite strong enough. But circumstances may render it impossible to procure solvents of the necessary strength, or it may be needful to add a large quantity of water to the collodion, as in sensitising an emulsion, when it should be borne in mind that by increasing the proportion of alcohol the mixture is rendered more fluid, and precipitation of the pyroxyline prevented. Water and ether are only miscible in certain proportions by themselves, but the addition of alcohol effects the mixture in all proportions. As a general rule it may be stated that the weaker the solvents the greater should be the proportion of alcohol.

Water is, as we have stated, frequently added to the collodion, and is occasionally found to act beneficially. The advantage derived from the use of water in dissolving salts which are little, if at all, affected by alcohol is altogether foreign to the present question; but strictly within the bounds of the subject may be mentioned the action of water in structurally modifying certain descriptions of pyroxyline of a specially horny character. When employed for this purpose the water must be added very sparingly, the quantity depending upon the nature of the cotton and the extent of the alteration required in the physical properties of the film.

These remarks are equally true when applied in connection with a sensitised emulsion, but the effects are liable to further modification by the new conditions introduced. Thus a collodion which is viscid and deficient in fluent qualities will, when burdened with the extra load of insoluble silver salt, give an emulsion possessing similar defects in an enhanced degree, while an over-fluid sample will lack the power of holding in suspension the particles of bromide forming the sensitive layer. The addition of water tends to porosity of the film, and at the same time, especially if carried to excess, to coarseness of deposit. Other things being equal it will be found that the finer films are obtained with collodion containing the smaller proportion of water.

Finally: in working large plates the great object is to secure a good flowing collodion which does not set too rapidly, while at the same time it is not too slow. This can only be done by carefully studying *all* the circumstances of the case—the quality of the pyroxyline and solvents as well as the nature of the salting formula. As regards the evils arising from too high a temperature, they are of a character so entirely dependent upon local circumstances that it is impossible to say much on the means of obviating them. It is, however, a mistake to trust too implicitly to the mere increase of the proportion of alcohol to produce a smoothly-flowing collodion; the desired effect in this case is, we think, to be attained rather by modifying the properties of the pyroxyline itself than by a variation in the solvents.

STENOCHROMY.

Under the title of "stenochromy" has been publicly introduced at the Society of Arts a peculiar kind of polychromatic printing which is likely to become eventually of much use in connection with photography. This is no idle conjecture, as may be gathered from the fact that the beautiful little picture of a Devonshire cottage, which was last year exhibited at the South London Photographic Society's technical meeting as the production of Mr. Walter B. Woodbury—and which, both there and subsequently in the editorial office of this Journal (where it was on exhibition for several months) was examined with great interest by numerous connoisseurs—was produced by the aid of this process. This picture had all the appearance of a highly-finished oil painting, for which, indeed, it was often mistaken, and a good deal of surprise was expressed on our explaining that the mere cost of its production did not exceed twopence. In reply to oft-repeated inquiries as to the mode of its production, all we could say at the time (Mr. Woodbury having left England for a season) was that by some process to us unknown a coloured backing had been prepared and a Woodburytype superimposed upon this backing, the combination of the two giving the effect we have described. We are now in a position to supply further details.

"Stenochromy" is the name given to a process of colour printing by means of which, by a single operation, effects can be obtained of a character similar to those only secured in chromolithography by a great number of printings; for in chromolithography each colour necessitates a separate printing. But not only are a considerable number of printings reduced to a single operation, but this latter possesses the further advantage over the former that it is a typographic or, more correctly speaking, a surface method of printing, the advantages of which over lithographic printing will be best appreciated by those to whom the two great methods now practised are familiar. Premising that we have been shown by Mr. Meyerstein numerous examples of the applications of stenochromy, we proceed to give a brief description of the process.

We may, in the first place, state that a stenochrome is printed from a surface block, and forms a painting composed of certain saponaceous pigments which, when subjected to pressure, "set off," or print upon any surface that is pressed in contact with the coloured surface. But—and here is the important point—the various pigments of which this printing surface is composed do not form a mere superficial layer, but are of the thickness of an inch or more. Each pigment bears to another precisely the same relation all through the thickness of the block, so that the first print obtained will be exactly similar to that which is printed after the block has been used down to the last impression it is capable of yielding.

The pigments of which the printing block is composed are formed of fatty and oleaginous substances, mixed with ordinary colours, the result being a soapy pigment which melts at a given temperature. Care is taken in their preparation that all the pigments have the same melting point, and that when cooled they have the same specific gravity and yielding power, so that in the course of printing one shall not wear away any sooner than another, as that would speedily lead to the surface becoming uneven.

The method by which a colour block is prepared is as follows:—A frame about one or two inches in depth, and of dimensions to suit the photograph or picture to be coloured, having been procured, the operator fills this frame or a certain portion of it with a pigment of the same colour as the groundwork, which we shall assume to be black. The various colours, we may state, are kept in small tinned vessels, and when used are in a fluid state, having been melted by the application of heat. They are applied by being poured out from a suitable spout, and the colour solidifies quickly.

The outline of the picture is traced upon this ground, or upon that portion of it which exists; for it is not necessary that more of the frame shall be filled with the ground colour than will suffice to print the ground of the picture. To prevent this frame from being needlessly filled with colour movable protecting slips are used, which act as an embankment, and prevent the colour from flowing where it is not required. The outline bordering upon the ground having been drawn, a knife of a peculiar construction—and which is free to move in every direction by a kind of lazy-tongs holder, but which always preserves a vertical position—is now moved along the outline and cuts away all the colour up to that outline. Another slip is then applied, and the next colour poured in; this comes up to, and remains in close contact with, the pigment first applied, yet so as not to mix with it. The protecting slips being once more removed the vertical knife is applied to the next outline, and the superfluous colour cut away in an absolutely vertical face as before, this operation being repeated for each pigment, until the block has been completed.

The next operation consists in placing the block upon a press, where, by means of a horizontal knife, the surface is levelled; then the paper or other material upon which an impression is to be taken is placed upon the block, a zinc tympan is lowered upon the paper, pressure from a roller applied, and a print is produced.

Upon a colour print obtained in the manner described is printed what is known as the "over-print," which, as in the case of a Woodburytype, supplies the shades and details, blending one colour imperceptibly into another. In the manner described was produced the charming little Woodbury print to which reference has been made at the commencement of this article..

Now that the process of stenochromy has been introduced we anticipate much from its application.

Some weeks ago we recommended, as a solvent for india-rubber for photographic purposes, a mixture of ether and the common petroleum spirit used for burning purposes. This mixture, as we then stated, forms an excellent solvent; but we have found some inconvenience to arise from the presence of greasy matter in the spirit obtained from the ordinary source—the oilman. The effect of the grease may be seen to advantage by pouring some of the rubber solution upon a plate of glass and drying by means of heat, afterwards setting the plate away in a cool place for an hour or two. At the end of that time, if grease be present, it will show itself in the form of a collection of moist-looking spots of an irregular, circular form, and varying in size from a small pinhead to the size of a pea, or even larger. They are scattered pretty evenly over the whole surface of the plate, but are thicker towards the corner from which the surplus solution is poured off, and appear to have exuded from the pores of the india-rubber film and spread in a circular form upon the surface. It is needless to say that if such a solution be used either as a preliminary coating for dry plates or for mounting purposes, the results are far from satisfactory; and, though we are inclined to believe that the grease may have been an accidental contamination in the sample of benzoline we last obtained, we have adopted a plan which successfully removes all danger. It consists in shaking up the suspected spirit with a small quantity of strong solution of alkali at intervals during some hours, and, after allowing the mixed liquids to separate into distinct strata, we remove the spirit by means of a syphon or otherwise as may be convenient, the alkali retaining the greasy matter in solution, and leaving the spirit perfectly clean. Caustic potash and saturated solution of carbonate of soda act remarkably well, thus removing impurities; but unless great care be exercised, and sufficient time allowed for the aqueous solution to separate, minute globules of the alkali are apt to remain in suspension and, as a matter of course, prove quite as objectionable as the grease. In order to avoid this we have used an alternative plan which is, perhaps, advantageous in other respects: we substitute for the alkaline solution a few fragments of unslaked lime, and subject the whole to occasional agitation as before. By adopting this method we avoid the addition of any water, and the caustic lime forms, with the grease present, an insoluble "soap," which, together with the lime, is easily removed by filtration. We have not found that any appreciable trace of alkali is retained by the spirit, except in the case where globules of the solution remain in suspension; at anyrate, the amount of alkali, if any be so retained, is so small as not to affect the sensitive film when the spirit is used for the purpose of forming a substratum.

ON THE COLOUR OF PHOTOGRAPHIC PICTURES.

[A communication to the South London Photographic Society.]

The short paper I am about to read might, perhaps, be more correctly termed a series of remarks strung together on the spur of the moment rather than a paper.

There is not the slightest doubt that it will always be a matter of individual taste as to the best colour to make our pictures, and, obviously, there will be advocates for each good tint. Nevertheless, if we form our judgment principally from pictures that have been awarded high commendation by those most competent to give it, we shall limit the area of our observation perhaps to some advantage.

Photographic work may be divided into three classes—portraiture, landscape, and reproductions. It is a popular idea that the colour of the photograph should be in accordance with the subject individually considered; but, unless there be an immense number of each subject required, to do so would be utterly out of the question in a business point of view, even if this opinion be a correct one—which, I think, is somewhat doubtful. To a certain degree it may be, and in *special* cases is, undoubtedly right, but as a general rule I am inclined to differ from it.

If we refer to pictures that have won universal approbation we shall find that generally portraits of children and young people are made of a warmer tint than portraits of adults, and that ordinary *carte* vignette portraits are better if toned considerably past the brown stage and made into a warm black than if a brown colour were adopted. The larger the portrait the warmer the colour may be kept, as a much-toned, large-sized portrait of the ordinary kind is invariably less pleasing than if kept of a decidedly warm tint. In *carte* portraiture, which forms the staple of all that is done, whatever the subject may be, save and except children's vignettes (and they frequently are better for it), should be thoroughly toned and the brown tint entirely eradicated, as by so doing they are more generally pleasing, to say nothing about permanency, supposing the process used is silver printing.

The objection raised against much-toned portraits has been on account of the proof so toned being frequently poor and flat, and the shadows much deteriorated in brilliancy. There is no *necessity* whatever that well-toned prints should be either flat or poor-looking. In corroboration of this I will instance the portrait of Mr. Edge, of Llandudno; also, the small composition pictures by the same gentleman that in all probability most of you have seen—all of which will be found thoroughly toned and the brown tint entirely destroyed, and yet they are not poor or weak in quality, but, contrariwise, they are very brilliant and effective. His aim was always to produce a colour as near as possible to that of a good engraving. As Mr. Edge is not in the habit of sending pictures for exhibition they cannot be expected to influence photographers generally, although those who have had the opportunity of seeing them are unanimous in their admiration. It is a matter for regret that we do not have the opportunity of seeing them on the walls of our exhibitions every season.

In considering the larger sizes of portraits, the subject suggests the necessity for some deviation from the colour adopted for smaller work, and each picture will, in all probability, gain by a special treatment in this respect. As I have just now remarked, large portraits of an ordinary kind are, as a rule, best kept warm; but if the portraits be subservient to the design—that is, when preserving the likeness is not the point particularly aimed at, but the artist desires to compose a picture irrespective of it—then they, as it were, leave the domain of portraiture and become pictures (I do not mean to infer portraits cannot be pictures, but that design and composition is the principal intention), which, being in monochrome, more closely resemble the style of an engraving than that of a painting. Such photographs, then, are better if thoroughly toned, and not a vestige of brown colour left. If any of you have seen prints from such negatives, as I have no doubt you have, of the two colours side by side, you will have no hesitation, I think, in pronouncing the thoroughly-toned ones best. These remarks also apply to copies of engravings, drawings, paintings, and everything of a similar character, none of which should be of a colour approaching brown.

With regard to landscapes: thoroughly-toned works are, as a rule, the best, and I think no landscape was ever printed that did not look better well toned than only slightly so, with this exception—that a landscape representing everything in the blaze of the rising or setting sun, with the shadows projecting *towards* the camera, will look well in either colour, and in some instances may, perhaps, be made quite warm with advantage; but such instances are rare. I have seen one or two, but they are by no means common, such times being rarely selected by the photographer for work. For any other subjects no brown tint should be left in.

Except at sunset or sunrise all distances and middle distances are more or less grey, with a considerable amount of blue in them, and a more true representation of nature under such circumstances is undoubtedly made by eliminating any suspicion of brown from the proof. If we examine any landscape photograph where atmospheric effect is delicately and carefully rendered, the fact of thorough toning will invariably be found to be the method employed. If we take the photographs of Wilson, W. Edwards, or Bedford we shall find this the rule most strictly adhered to. There are some landscape photographers, whose negative work is most careful and praiseworthy, who adopt such brown colours that their pictures seen for sale in the shop windows look indifferent and unsatisfactory, merely from the colour chosen and nothing else. They seem destitute of feeling, so to speak; and, although well-manipulated photographs, they do not give that satisfaction to the eye they otherwise would do if the colour were different.

A subject of this kind, upon which there are so many and various opinions, will, I hope, give rise to some discussion as to the advantage or disadvantage possessed by each or any method of toning.

Edward Dunmore.

ON THINGS IN GENERAL.

My last ramblings for this year would have a sense of incompleteness if they did not refer to some patent or secret process (art by machinery). We have heard a great deal lately about the violet glass of M. Scotellari's studio, which, no doubt, is already relegated to the limbo of useless processes; but what are his modest claims compared with those advanced by M. Klary!

M. Klary's name has been before us for a considerable time. Again comes the cry—Artistic effects to be taught by a "system!" Buy his book, read it for ten minutes, and you have the gifts of a Rembrandt and a Raphael concentrated in your own sagacious self! In fact, nowadays, we reverse the trite apothegm, *nascitur poeta non fit;* he is—at anyrate the artist is—made in a moment by the deposit of the necessary fee; and it is only necessary to part with your dollars and get in exchange a full infiltration of that divine afflatus—that subtle ichor—to be possessed of which was of yore to be looked upon with awe and reverence. Now—but let the circular speak for itself. The above-named gentleman, dating from "Afric's burning shore," "since many years has been constantly occupied with the illuminations appropriated to photographic pictures." "Seduced, enraptured by the wonderful results obtained by some photographs, he has not hesitated to devote his time, and has not recoiled from any expenditure in order to stndy," &c. Thus he "obtained the certainty that the production of a good portrait depends almost exclusively of the light, or rather of its rationale and well-ordered appointments; and by the aid of *my system* and of *my apparatus* one can obtain perfect photographic pictures, and bearing a true artist-like stamp." "In ten minutes of intentness, and after a few moments of practice, every one will better comprehend the science of lighting than in experimenting year after year with any other method."

Convinced of his ability, and anxious to make the world of photographers to share in his discovery, he only wants a hundred francs from every one, and to help him in obtaining them he seems to have been issuing circulars broadcast over the land to advertise his "System of lighting appropriated to photographic portraits, by the aid of an apparatus destined to regulate and control the light in a studio, however may be its construction and orientation!!"

This "artist-photographer" evidently holds no mean opinion of his ability; neither do I of his business ability. I had thought that this exploitation of processes was the property of English-speaking lands, but it is evidently not so; the art of humbug must be of cosmopolitan distribution. I saw, in the *Moniteur* for November 16, an article specially devoted to a new developer which was to reduce exposure by one-half, several leading photographers to whom the inventor (who wishes to keep his name secret) had given the formula having already employed it with success. One would think this was public enough, but I am told that it has been since printed in England as a special contribution to the readers of some other paper. *Vive l'attrape!*

Perhaps I ought not to run directly on from this theme to that which has been one of the events of the month—the great spiritualistic discussion at Glasgow. There was plenty of hard hitting, much want of l ogic, and Mr. Urie had hard work to hold his own. If ever Mr. Urie had read that the world was divided into "those who read and those who write, those who think and foxhunters," he evidently would substitute spiritualists for the sporting characters. The supreme steadfastness of belief exhibited by Mr. Bowman, and his calm assumption of superiority—evidently tempered by a little blending of pity—was positively sublime. Hear him:—"Spirit painting had been actually demonstrated as a fact, and did not now need to be proved." It is difficult to see the connection between spirit painting in the dark and the object of the Glasgow Photographic Association, and still more so to understand how anyone could propose that the whole Society should officially join a *séance* to ascertain the genuineness of the manifestations. They might first have a preliminary meeting to discuss Leigh Hunt's theories as to the difference between nonsense and want of sense.

I think that, at anyrate, we might class under the former of the two heads a grave proposition by Mr. Curtis Taylor, in a paper read before the National Photographic Association, printed in the *Philadelphia Photographer.* He has investigated various causes of distortion, alleged or real, and, while combating the existence of many so-called distortions, he has discovered a new cause for the twisting awry of one's features in a paper photograph; and now I suppose we shall have all sorts of absurd changes rung on his idea. He has found that paper contracts in drying after wetting in an unequal manner—more in width than in length—to an extent of one-fortieth. Now, assuming the correctness of the measurements, and leaving out of consideration for the moment the fact that all paper is wetted and dried before it is printed—that is, after the contraction has taken place—is it possible that anyone can believe that an error of one-fortieth lengthwise or breadthwise in the proportions of a face could be perceived by the unaided eye? But this writer not only professes to see it, but to find that "this evil is not without its compensation in giving us an opportunity to change the effect of a negative in latitude and longitude." He further recommends the paper-makers to make an alteration in their mode of manufacture to obviate this defect. This discovery must be pared off with the one, also just published, that when you cannot focus a picture you must look out for cross lights, as they are the cause of the difficulty.

Among the rumours flying about among the gossipers is one to the effect that Mr. J. A. Spencer, whose name for so many years has been associated with the Autotype Company, has ceased to be a partner in that firm, and has retired so far as active life in connection with carbon printing is concerned. That this gentleman may long enjoy his *otium cum dignitate* will be the wish of the very large circle of his friends.

What a great pother has been raised about the underground photographing lately, as described in the *Birmingham Post.* Mr. Brothers' previous efforts in the same direction are matters of history, and Professor Piazzi Smyth's famous pyramid photographs are, or should be, known to every one. There seems little doubt that Mr. Brown's photographs are fine examples of technical skill and obstacles perseveringly overcome, and he deserves his meed of praise for any successful effort out of the usual rut into which most workers run.

How long will it be before photographers can fully understand the provisions of the Copyright Act? We have all heard how easy it is

to drive a coach and four through an act of parliament, and few will doubt that this particular act of parliament is rather above the average for difficulty of comprehension to non-legal readers. Still, after all this, there is no excuse for not being able to master its meaning after the lucid comments and explanations from the editorial chair (ought I not rather to say chairs?—it is difficult to "fix" the editorial trio sometimes), and the masterly summary by Mr. P. Le Neve Foster, sometime ago published in these columns.

What shall we say about Professor Stebbing's last communication? A small, easily-worked engine would be useful for many purposes in large photographic establishments; and, if all the promises are fulfilled, M. Ch. Boutet's new atmospheric engine will be the very thing wanted. Professor Stebbing, however, while giving a full account of others' opinions, and the working of the instrument itself, very cautiously (and I need not say wisely) abstains from presenting his own views as to the future possibilities of the machine. The truth is that if it would do all that is claimed for it perpetual motion is discovered, conservation of energy is a figment, and the whole fabric of modern physics will be revolutionised. We shall see what we shall see!

If only it could have been exhibited at the unfortunate South London Technical Exhibition what an attraction it would have been! It would have removed all reproach from that one-time famous institution, and have again caused it to come off with flying colours. I was very sorry to see such a failure, for there was from former experience so much promise for future success. It will be doubly unfortunate if so promising an undertaking should succumb in the future to the blight of the recent exhibition, as is too often, unfortunately, the case under similar circumstances.

Nothing will please the readers of this Journal more than to see the old familiar signature of Hardwich once more in its pages. May he often therein enlighten and instruct us in the future!

I noted with some amusement one of his recommendations with regard to keeping open the taps of the gas bags, for it called to mind a rather droll incident I once heard of, and which I believe to be true. An exhibitor at a country place, where there was a private gas-works, left his hydrogen bag attached to a branch pipe from which he had unscrewed the burner. Leaving it to fill while he made his preparations he returned half-an-hour before the exhibition was to open expecting to find his gas bag in a state of plethoric fulness. Judge of his dismay when he found the pressure was so slight that the bag was not one-fourth full! What was he to do? A bright inspiration struck him—he found the gas-holder itself, attached his bag to a small tap he found on the top, and turned the cock. Woe again! It would not fill. What was he to do? He was frantic for fear of disgrace and loss! Final happy inspiration! He deliberately got on the top of the gas-holder and *sat there* till the india-rubber receptacle was fully distended, which now happened with the utmost dispatch. Great excitement was caused in the village by the sudden "flare-up" which all the lights with the tap full on exhibited during the brief practical experiment of the exhibitor. It was not till the morning that the secret oozed out.

FREE LANCE.

NEW EXPERIMENTS IN INTENSIFICATION WITH LEAD.*

CLEARING MEDIUMS FOR NEGATIVES INTENSIFIED WITH LEAD.—These are intended to remove the fog, which, whether really present before in the silver negative or not, first makes its appearance after intensification with lead. They must be applied to the well-washed negative before the plate is blackened. The most complete means of eradicating the fog and weakening the negative is with hyposulphite of soda. The ordinary fixing solution (about one to four) of this salt would quickly and perfectly dissolve away the whole white picture, so that only the collodion film would remain; because ferrocyanide of silver and ferrocyanide of lead—the components of the picture—are both very soluble in a solution of hyposulphite of soda. Concentrated solutions are, therefore, too energetic in their action for clearing the picture, and, besides, their action can neither be controlled nor limited. A dilute solution—say of one to twenty—is, however, perfectly adapted to this end, and many foggy negatives may be rescued by it.

Cyanide of potassium only makes the negative clearer and thinner to a certain extent, nor by continuing the action does it act further as a solvent; but, notwithstanding that, it may serve our purpose. By cyanide of potassium ferrocyanide of silver only is dissolved; but the ferrocyanide of lead is converted into cyanide of lead, which is insoluble in excess of cyanide of potassium.

* Continued from page 581.

Carbonates of soda and potash also make the white, lead pictures thinner, and so does caustic potash. (Basic carbonate of lead is less soluble in alkaline carbonates.*)

Tartarate of ammonia dissolves the ferrocyanide of lead.

As to the resistance of the lead picture to various other agents further data will be given hereafter.

Formation of Relief.—A negative intensified with lead and sulphur stands out, when dry, in distinct relief—more distinct than is seen by any other method of intensification. This formation in relief might, perhaps, be utilised, after Scamoni's example, for the production of galvanoplastic printing plates. When we have an opportunity we intend to investigate the circumstance more fully.

If one attempts to change a negative intensified with silver into a relief by treating it in the lead bath, two misfortunes happen—firstly, the unavoidable fogging of the silver intensification does away, more or less, with the difference between the heights and the depths; and, secondly, the thin collodion film becomes so overladen with precipitates that it becomes as thick as a card, and then cracks and peels off. We have not tried remedies such as a substratum, nor a special preparation of the collodion.

Until now we have always assumed that the white negative treated in the lead bath is afterwards blackened by having sulphide of ammonium poured over it to make it more firm and durable; but there are other means of increasing the durability and firmness of these besides the foregoing. We shall now mention but two, though further on, under the heading of *Behaviour of the Lead Picture with Reagents*, a great number of such are mentioned—the one because it combines in itself many advantages, and can easily be used as a substitute for sulphide of ammonium, and is, therefore, of practical value; the other, because these advantages are wrongly attributed to it, and, if taken separately, it would occupy more space than could be allowed to it, without infringing on that of others in the division upon the behaviour of reagents.

Intensification with Chromate of Lead.—One coats a well-washed and, preferably, still damp lead picture with a solution of chromate or bichromate of potassium. It almost instantaneously becomes a clear yellow, owing to the formation of chromate of lead (chrome yellow). By "lead picture" is meant a white negative, consisting of ferrocyanide of silver and lead, such as is obtained by placing a fixed and washed negative in a lead bath consisting of red prussiate and sulphate of lead. It is the ferrocyanide of lead only that is converted into a chromate by the potassic chromate, and not the ferrocyanide of silver. (That this is the case one can easily convince himself by converting a silver negative by means of red prussiate into ferrocyanide of silver, and then pouring chromate of potassium over it, when it will remain unchanged.) This method of intensification we shall call "chrome lead intensification."

The yellow colour of such a negative withstands the action of light and covers very well, though, perhaps, a little less than a plate blackened with sulphide of ammonium, as we know by experience, having used one to print from upon albumenised paper. For working in the direct sunlight these yellow negatives are better than the black ones, because they neither become so heated themselves nor allow the film under them to become so.

It is remarkable that chromate of potassium (we use a solution of one to ten) furnishes considerably more intense negatives, and of a deeper yellow, than an equally concentrated solution of the *bi*chromate; and on that account we give the preference to the monochromate. If, after being yellowed, the plate should be too thin, it may, without any disadvantage, after being properly washed, be placed in the lead bath again, in order to make up for its having been left there too short a time at first; and, finally, it is again treated with the chrome solution. After the lead picture has been blackened with sulphide of ammonium such a second immersion is of little or no use, because sulphide of ammonium, especially the strong yellow-coloured polysulphuret, converts the metallic silver into sulphate of silver, which has no action upon the lead bath.

Of covering over details, or of fogging, chromate of potassium is as little guilty as sulphide of ammonium—nay, that is a mistake, for it is even less guilty—as with it the fogs which are visible on negatives as they come out of the lead bath, and which were not yet distinctly visible in the thin, unintensified silver negative, disappear. The clear places in the lead picture still remain clear in the chrome-lead picture, and only the fog present from the beginning remains unchanged to the last, without gaining any more in intensity than any other part of the picture.

We were exceedingly astonished by Captain Waterhouse's statement that a plate treated with chromate of potassium often suffers

* See H. Rose in *Poggendorff's Annalen*, 95, page 426.

from "covering [closing] up of the lines." This is incorrect, because fog-free negatives can only be obtained by treatment with chromate of potassium, when the lead negative is *weakened* at the same time as it undergoes the colouring process, as Captain Waterhouse does with his iodide of iron and permanganate of potassium process. That one can effect the same thing with one of the previously-mentioned clearers, or by less intensification and continuation of the chrome colouring, and that in this way a false standard is laid down for the comparison of methods, is evident.

We ourselves rank the chrome-lead method of intensification next to the sulphur and lead process. It furnishes a dense film, and has not the unpleasantness of sulphide of ammonium. It certainly does not, nor do any of the modifications, attain the density of the sulphur and lead intensification; but it does not appear to come behind it in unchangeableness, and should be employed practically in many cases. We recommend it to those who cannot manage with sulphide of ammonium.

Now let us consider Captain Waterhouse's modification of the intensification with lead. He recommends treating the lead picture with a solution of iodide of iron and then with permanganate of potassium. After, however, our experiments with his process we find ourselves unable to concur in his recommendation, since nothing is gained by it either in simplicity or density; indeed, in both its results were behind not only the sulphur and lead but also the chromium and lead process. On treating an exceedingly-well-washed, white, lead negative with a solution of iodide of iron, iodide of silver and iodide of lead are formed; and, besides that, there is a bluish precipitate, which quickly becomes dark when exposed to the air and forms Berlin blue. Permanganate of potassium colours the film brown without adding anything worth mentioning to its strength.

Should anyone desire—though it does not seem to us probable that anyone will—to use the process in this form with the introduction of iron salts, the substitution of chloride of iron in place of iodide of iron, which is dear and difficult to manage, is advisable. There forms, then, besides chloride of silver and chloride of lead, Berlin blue also; finally, it is browned with permanganate of potassium. The yellow colour of the iodide of silver, as against that of the chloride of silver, does not come into competition with the preponderating covering of the other ingredients.

It seems to us that the most rational of the processes for producing brown negatives by means of permanganate of potassium is to coat the negative with permanganate of potassium immediately after it is taken out of the lead bath and washed. So intensified the negatives are not behind those treated on Captain Waterhouse's system in density, but cover much less than sulphur and lead plates, and also less than chromium and lead negatives; but then, on the contrary, they are better than white, lead pictures, as we have ascertained by experiments in printing.

Josef Maria Eder, M.D., and Victor Tóth, *Captain.*

(To be continued.)

ON THE REDUCTION OF BACK PRESSURE IN THE OXYGEN MACHINE.

[A communication to the Manchester Photographic Society.]

When filling a gas-bag with oxygen in the ordinary way, the gas coming from the retort to the washer and from thence to the bag need not meet with a greater resistance than is due to the depth of water in the washer, the friction in the pipes, and, perhaps, some stiffness in the material of the bag itself. The washer need not have a depth of more than three inches of water in it, so that if we take the total back pressure in the retort to be equal to four inches of a column of water we shall about know the worst. In the ordinary oxygen machine, as used for constant work, and having a gas holder two feet deep, the back pressure in the retort will be not less than twenty-four inches, or six times more than in the gas-bag retort. Whether this increase of resistance is any impediment to the liberation of the oxygen from the chlorate of potash or not I cannot say, but there will be a greater liability to the leakage of gas at any joint accidentally not quite air-tight.

To reduce the back pressure in the machine retort to something like what it is in the gas-bag retort I have made an addition so that I can fill the gas-holder now just the same, or nearly so, as if it were a bag. On the pillar tube carrying the retorts a side branch outlet is fixed having a stopcock on it; a piece of india-rubber tubing connects this branch to a Woulfe's washing-bottle placed a short distance down the outside of the cistern. Another piece of tubing connects the outlet of the washer to an inlet (also provided with a stopcock, on the top of the gas-holder. With this exception the oxygen machine remains unaltered.

When the gas from the plug in the retort begins to come over it may go down the long tube to the bottom of the gas-holder against the column of water in the cistern, and escape as usual; or if the two stopcocks be opened it will pass through the washer and into the gas-holder above the surface of the water inside, the pressure being considerably less that way.

If we suppose the gas-holder to be weighted to give a pressure of four inches, and the water in the washer to be two inches deep, the back pressure in the retort will be about six inches, instead of twenty-four inches, or only about half as much more as was supposed to be in the gas-bag retort.

By adopting the glass Woulfe's washing-bottle the bubbling of the gas can be seen much easier than can the sound be heard at the bottom of the cistern, especially if there be any other noises about.

M. Noton.

FOREIGN NOTES AND NEWS.

On the Present Depression of Trade.—On the Printing-In of Cloud Effects.—The Constitution of the Hamburg Photographic Assistants' Association.—The Influence of Violet Light.

In the *Mittheilungen* there is a long article by Dr. Weissenborn, in which he discusses the causes of the present depression of trade, and suggests as a remedy the introduction of some new size of portrait as a change from the familiar *carte de visite* and cabinet. He also suggests that, as albums are seldom opened and carbon transparencies are not unattainable, it would be a good plan to glaze windows from which the view is unpleasant, or in rooms where the full glare of light is not desired, with transparent positive portraits of the owners' friends or relations. It is questionable, however, if any man be so fond of his relations as to wish to have them always "standing in his light." A former suggestion—namely, that undesirable views should be shut out by means of landscape transparencies on ground or matt glass—is much more likely to find favour, as one can easily choose a beautiful landscape; while one's relatives' portraits, though they may be "joys for ever," are not necessarily "things of beauty."

In the *Correspondenz* Herr von Stefanowski has a long article on the printing-in of clouds, in which, naturally, he condemns the plan of using cotton-wool for that purpose, and suggests that the trouble of printing-in skies from separate negatives, or the clumsiness attending endeavours to print them in from glass negatives at the same time as the foreground, might be avoided by an adaptation of the carbon process. He would, by stopping-out the sky of the original negative, print upon a prepared carbon film the foreground only, then stop out the foreground of the new picture, and print-in the new sky; then, finally, use the new negative instead of the original. Many, and indeed most, of Herr Stefanowski's remarks are far from new, nor does he present them as such; but there is one point which he urges to which far too little attention is paid by those who print-in their skies. It is, when choosing a sky to print-in, to see that the greatest mass of clouds corresponds to shade in that part of the foreground under it where its shadow would naturally fall, otherwise the want of harmony between the sky and landscape will be more painful than the original sky would be if left.

Mention has already been made of the Hamburg Photographic Assistants' Society; but some further details as to the constitution of this most useful institution may be acceptable to those of our readers who are *employés*, and may even induce some of the more enterprising who reside in the larger centres of commerce to start a similar association with the modifications required to adapt it for transplantation to our soil.

The Society has two principal ends in view—first, the promotion of an *entente cordiale* between employers and employed; and, second, the promotion of acquaintance and good fellowship between the members of the Society and the furthering of their material interests. For the attainment of the first object the principal means taken is an employment register, upon which no one can be placed who cannot bring a certificate of having given notice to his former employer. At the same time they encourage energetic young men to move occasionally from one part of the country to another in order to gain an insight into the different methods of working, and to avoid getting into a rut, by lending them from a special fund the sum required for their travelling expenses, the sum being repayable by instalments. There is also a fund from which small sums are lent to members during sickness and in certain other cases; and though these funds

have existed only for two years they are very prosperous and working well. It will be seen that the aid rendered is not in the shape of alms, but of a loan repayable within certain limits as to time, and therefore assisting the member who finds himself in temporary difficulties without injuring his self-respect, he having been a contributor to the fund himself in his better days, and hoping to be so again when he shall have placed his feet on solid ground. The Society meets once a month for discussions of the usual type upon scientific and technical subjects. It has also a weekly meeting at which minor business is transacted, the employment agency is conducted, and the members have an opportunity of becoming acquainted with each other and indulging in a social chat upon matters not necessarily photographic, or having a quiet game at draughts, dominoes, chess, &c., or reading some of the technical journals provided by the Society. Lastly: the membership is not confined to residents in Hamburg, for there are upon the roll of the Society, we believe, not only members in all parts of Germany, but some who have come even as far afield as England.

It will be remembered that at the November meeting of the Photographic Society of France M. Scotellari spoke of certain alleged advantages that resulted from using violet glass for illuminating the studio. A recent number of the *Bulletin de la Société Française* contains the address of M. Scotellari, from which we are enabled to give an extended report of his observations.

The violet rays of the solar spectrum possess chemical properties to a greater extent than all others, and are less luminous. M. Scotellari conceived the idea of making the studio of glass of this colour, but such glass was very expensive and not always uniform in tint, so he confined himself to violet curtains glazed with tinted varnish. Draper's experience was that the violet surface reflected the least quantity of light; and Frauenhofer and Herschel found that it was the yellow which gave the greatest luminous intensity, violet giving the least. Scheele, on the other hand, found that it was the violet light which gave the greatest chemical intensity. The luminous parts of the spectrum are not produced in certain limits of the undulation of the ether; in fact, for violet the number of undulations is seven hundred and twenty-eight millions of millions per second, and for red only four hundred and ninety-six millions of millions, according to Stokes. In a great number of phenomena the light behaved as a chemical agent. For example: the protochloride of mercury and chloride of silver darkened by the action of light, and diaphanous phosphorus became opaque. The different colours of the spectrum do not possess the same chemical action. Scheele observed in 1770 that chloride of silver exposed to the light became of a violet colour, which darkened in proportion to the time it was exposed to light,

M. Prat, the celebrated chemist, of Bordeaux, who assisted the writer with his experiments, has arrived at the following conclusions:—1. Violet light operates more rapidly than white or blue light, and diminishes by nearly one-half the time required for exposure. 2. In consequence of the homogeneity of the tint reflected on the face the negatives are better, and there is less necessity for retouching them. 3. With regard to the fidelity of portraits, certain persons who are very impressible to the ordinary light can be taken under the influence of violet light. The resemblance obtained is perfect, owing to the placidity of the features. 4. Photographs taken in violet light are the best modelled, have the best details in the shadows as well as in the lights, and, in fine, are very superior to those obtained by the ordinary mode.

ON THE ASSIMILATING OF FRENCH AND ENGLISH FORMULÆ.

I do not imagine there exists a photographer who does not occasionally vent his feelings in strong expletives at the confused nature of photographic formulæ and the difficulties he must encounter in correctly converting the proportions and quantities given by German and French writers and journalists into those of our well-known English weights and measures—the ounce, the drachm, and the grain in the one department of measurement, and the pint, the ounce, the drachm, and the minim in the other, instead of the litre, the cubic centimètre, the gramme, or the decigramme.

Many good experiments in photography are disregarded simply because the formulæ are given in French weights and measures, photographers being, as a rule, too much engrossed with their business to think of converting such proportions into English equivalents. Some of them, even, when giving the equivalent of (say) one gramme, do not think, or may not be capable, of working out the English equivalent of eighteen or twenty grammes, because the unit is given with perhaps three or four decimals, which to many persons is confusing.

Having, in converting French into English formulæ, experienced much loss of time occasionally in working out the proportions, it has occurred to me that the preparation of such a table as might meet nearly every case would prove very useful to photographers. I am quite aware that *rules* for effecting such conversion are published year after year in The British Journal Photographic Almanac; but those do not quite meet the case, or, at any rate, they do so in the hands of only a few, and even then it involves a certain loss of time. What I aim at is the production of an extended table by referring to which the equivalent of any French formulæ will immediately, and without the necessity for computation, be found in English weights and measures.

I am well aware that tables such as I shall append have been already published on behalf of photographers; but in every instance that I have seen they are so inaccurate as to be quite misleading. For example: in *The Photographer's Pocket Reference Book and Dictionary*, prepared by an eminent continental writer, the compiler, starting with the idea that there are sixteen grains in a gramme, very soon multiplies this error (only a slight one at starting) to such an extent as to give 320 grains as the equivalent of twenty grammes. In reality the English equivalent of a gramme is 15·436, or nearly fifteen and a-half grains; but this, when perpetuated to twenty grammes, makes it consist, not of 320 grains, as stated, but only 308 grains.

Perhaps a slight explanation of the method of converting decimals into fractions may not be out of place here. The word decimal comes from the Latin *decem*, ten; and a decimal is expressed by placing a figure after a point. Hence, if we say 1·5, it is the same as $1\frac{5}{10}$, or reducing the fraction $1\frac{1}{2}$. Again: 4·25 is the same as $4\frac{25}{100}$ or $4\frac{1}{4}$. In the table of grammes I have converted the decimals into a fraction. Of course it is not absolutely exact, but it is sufficiently accurate for practical purposes, being in nearly every case within a tenth part of a grain. This, I need not say, is a much smaller fractional part of a grain than will ever be employed by photographers, to whom *one* grain or, at most, half-a-grain will prove to be the nearest approach to accuracy in weighing out the ingredients composing a photographic prescription.

I start thus: 1 gramme is equal to 15·4346 grains, or $15\frac{4346}{10000}$; but, as I have just said, it is not imperative that proportions need be so exact as to include the tenth part of a grain, so I make 1 gramme equal to 15·4 or $15\frac{2}{5}$.

On this principle is computed the following table, which will enable the photographer to ascertain at a glance the English equivalent of a certain number of grammes:—

1	gramme	=	$15\frac{2}{5}$	grains.					
2	grammes	=	$30\frac{4}{5}$	,,					
3	,,	=	$46\frac{1}{5}$	,,					
4	,,	=	$61\frac{3}{5}$	,,	...... or	1	drachm	$1\frac{3}{5}$	grain.
5	,,	=	77	,,	...... ,,	1	,,	17	grains.
6	,,	=	$92\frac{2}{5}$	,,	...... ,,	1	,,	$32\frac{2}{5}$	,,
7	,,	=	$107\frac{4}{5}$	,,	...... ,,	1	,,	$47\frac{4}{5}$	,,
8	,,	=	$123\frac{1}{5}$	,,	...... ,,	2	drachms	$3\frac{1}{5}$	,,
9	,,	=	$138\frac{3}{5}$	,,	...... ,,	2	,,	$18\frac{3}{5}$	,,
10	,,	=	154	,,	...... ,,	2	,,	34	,,
11	,,	=	$169\frac{2}{5}$	,,	...... ,,	2	,,	$49\frac{2}{5}$	,,
12	,,	=	$184\frac{4}{5}$	,,	...... ,,	3	,,	$4\frac{4}{5}$	,,
13	,,	=	$200\frac{1}{5}$	,,	...... ,,	3	,,	$20\frac{1}{5}$	,,
14	,,	=	$215\frac{3}{5}$	,,	...... ,,	3	,,	$35\frac{3}{5}$	,,
15	,,	=	231	,,	...... ,,	3	,,	51	,,
16	,,	=	$246\frac{2}{5}$	,,	...... ,,	4	,,	$6\frac{2}{5}$	,,
17	,,	=	$261\frac{4}{5}$	,,	...... ,,	4	,,	$21\frac{4}{5}$	,,
18	,,	=	$277\frac{1}{5}$	,,	...... ,,	4	,,	$37\frac{1}{5}$	,,
19	,,	=	$292\frac{3}{5}$	,,	...... ,,	4	,,	$52\frac{3}{5}$	,,
20	,,	=	308	,,	...... ,,	5	,,	8	,,
30	,,	=	462	,,	...... ,,	7	,,	42	,,
40	,,	=	616	,,	...... ,,	10	,,	16	,,
50	,,	=	770	,,	...... ,,	12	,,	50	,,
60	,,	=	924	,,	...... ,,	15	,,	24	,,
70	,,	=	1078	,,	...... ,,	17	,,	58	,,
80	,,	=	1232	,,	...... ,,	20	,,	32	,,
90	,,	=	1386	,,	...... ,,	23	,,	6	,,
100	,,	=	1540	,,	...... ,,	25	,,	40	,,

French Fluid Measures.

The cubic centimètre usually represented by "c. c." is the unit of the French measurement for liquids. It contains nearly seventeen minims of water; in reality, it contains 16·896 minims. The weight of this quantity of water is one gramme. Hence it will be seen that the cubic centimètre and the gramme bear to each other the same relation as our drachm for solids and the drachm for fluids, or as the minim and the grain. As before, there is a certain latitude taken in

computing the following table; but it will prove to be sufficiently accurate for photographic purposes:—

1	cubic centimètre	=	17	minims (as near as possible).							
2	cubic centimètres	=	34	,,							
3	,,	=	51	,,							
4	,,	=	68	,,	or	1	drachm	8	minims.		
5	,,	=	85	,,	,,	1	,,	25	,,		
6	,,	=	102	,,	,,	1	,,	42	,,		
7	,,	=	119	,,	,,	1	,,	59	,,		
8	,,	=	136	,,	,,	2	drachms	16	,,		
9	,,	=	153	,,	,,	2	,,	33	,,		
10	,,	=	170	,,	,,	2	,,	50	,,		
20	,,	=	340	,,	,,	5	,,	40	,,		
30	,,	=	510	,,	,,	1	ounce	0	drachm	30	minims.
40	,,	=	680	,,	,,	1	,,	3	drachms	20	,,
50	,,	=	850	,,	,,	1	,,	6	,,	10	,,
60	,,	=	1020	,,	,,	2	ounces	1	,,	0	,,
70	,,	=	1190	,,	,,	2	,,	3	,,	50	,,
80	,,	=	1360	,,	,,	2	,,	6	,,	40	,,
90	,,	=	1530	,,	,,	3	,,	1	,,	50	,,
100	,,	=	1700	,,	,,	3	,,	4	,,	20	,,

Tables for the conversion of formulæ would not be complete were the thermometer "left out in the cold." There are three standards of thermometric measurement adopted, and the reduction of these sometimes occasions as much trouble as that of weights and fluid measurements.

In Germany the Réaumur scale is adopted, and in France that known as the "Centigrade" or "Celsius" prevails. It scarcely need be said that in this country the scale of Fahrenheit is exclusively used. In the following table, which extends from the point at which water boils down to that at which it freezes, the relative values on each of the three scales are found given side by side—the Celsius, or Centigrade, which is now much adopted by chemists, being reduced to Réaumur and Fahrenheit:—

Celsius.	Réaumur.	Fahrenheit.	Celsius.	Réaumur.	Fahrenheit.
100	80·0	212·0	49	39·2	120·2
99	79·2	210·0	48	38·4	118·4
98	78·4	208·4	47	37·6	116·6
97	77·6	206·6	46	36·8	114·8
96	76·8	204·8	45	36·0	113·0
95	76·0	203·0	44	35·2	111·2
94	75·2	201·2	43	34·8	109·4
93	74·4	199·4	42	33·6	107·6
92	73·6	197·6	41	32·8	105·8
91	72·8	195·8	40	32·0	104·0
90	72·0	194·0	39	31·2	102·2
89	71·2	192·2	38	30·4	100·4
88	70·4	190·4	37	29·6	98·6
87	69·6	188·6	36	28·8	96·8
86	68·8	186·8	35	28·0	95·0
85	68·0	185·0	34	27·2	93·2
84	67·2	183·2	33	26·4	91·4
83	66·4	181·4	32	25·6	89·6
82	65·6	179·6	31	24·8	87·8
81	64·8	177·8	30	24·0	86·0
80	64·0	176·0	29	23·2	84·2
79	63·2	174·2	28	22·4	82·4
78	62·4	172·4	27	21·6	80·6
77	61·6	170·6	26	20·8	78·8
76	60·8	168·8	25	20·0	77·0
75	60·0	167·0	24	19·2	75·2
74	59·2	165·2	23	18·4	73·4
73	58·4	163·4	22	17·6	71·6
72	57·6	161·6	21	16·8	69·8
71	56·8	159·8	20	16·0	68·0
70	56·0	158·0	19	15·2	66·2
69	55·2	156·2	18	14·4	64·4
68	54·4	154·4	17	13·6	62·6
67	53·6	152·6	16	12·8	60·8
66	52·8	150·8	15	12·0	59·0
65	52·0	149·0	14	11·2	57·2
64	51·2	147·2	13	10·4	55·4
63	50·4	145·4	12	9·6	53·6
62	49·6	143·6	11	8·8	51·8
61	48·8	141·8	10	8·0	50·0
60	48·0	140·0	9	7·2	48·2
59	47·2	138·2	8	6·4	46·4
58	46·4	136·4	7	5·6	44·6
57	45·6	134·6	6	4·8	42·8
56	44·8	132·8	5	4·0	41·0
55	44·0	131·0	4	3·2	39·2
54	43·2	129·2	3	2·4	37·4
53	42·4	127·4	2	1·6	36·5
52	41·6	125·6	1	0·8	33.8
51	40·8	123·8	0	0·0	32·0
50	40·0	122·0			

The foregoing tables will, I believe, prove of much use to photographers in the reduction of formulæ from foreign to English measurements.

J. H. TAYLOR.

Our Editorial Table.

INSTRUCTION IN PHOTOGRAPHY. By Captain ABNEY, F.R.S., &c. London: PIPER AND CARTER.

WE are pleased to see that Captain Abney's book of "Instruction" has been so well appreciated as to necessitate the issuing of a third edition. This edition is in several respects an improvement upon the former two, and is, besides, illustrated by a Woodburytype of the author's picture, *In Windsor Forest*. There is in these pages much useful matter connected with several of the processes, wet and dry, in common use; and we are pleased to find that a prominent place is given to the washed collodion and gelatine emulsion processes. In associating the name of Mr. J. King with that of Mr. W. B. Bolton, in the introductory remarks on washed collodion emulsion, the author, doubtless, overlooked the fact that Mr. King's suggestion of dialysis as a means of removing crystallisable salts had reference to gelatine alone, Mr. Bolton's name being associated with the washing of the *collodion* in that emulsion process. The chapter on "Defects in Negatives—their Causes and Remedies" is very practical and valuable, and will be found exceedingly acceptable to many inexperienced readers. There are numerous "hints and dodges" to be found in this manual, which has our best wishes for its success.

CHROMOLITHOGRAPHS.
By A. and G. TAYLOR, London.

To what extent photography has aided in the production of these excellent *facsimiles* (in all but dimensions) of charming originals, which are well known to several of our readers, we are not at present in a position to state with any degree of confidence; suffice it to say that four more charming subjects, or better printed, are not easily to be found. Two of them—respectively *The Farmer's Daughter* and *The Fisherman's Daughter*, by Henzell—acquire an interest, in addition to that arising from their pictorial merit, from the fact that the talented artist died only a few weeks since. The other two form a pair from originals by Bromley, and are entitled, respectively, *The Gossip* and *The Rustic Anglers*. The highest skill of the chromolithographer has been brought to bear upon the reproduction of these works of art.

Meetings of Societies.

SOUTH LONDON PHOTOGRAPHIC SOCIETY.

THE annual meeting of this Society was held on Thursday, the 14th inst.,—the Rev. F. F. Statham, M.A., President, in the chair.

Mr. P. Mawdsley having been elected a member, the Secretary read the following

ANNUAL REPORT.

YOUR Committee, in presenting the Annual Report of the South London Photographic Society for the session 1876, have still to congratulate the members that, notwithstanding the depression which seems to have fallen upon all other matters, the general interest in subjects appertaining to our art-science has not met with a corresponding decrease amongst the members of this Society, save in one particular, namely, the "Annual Technical Exhibition," which, notwithstanding every effort made towards success, has not this session fulfilled the expectations anticipated.

In connection with this your Committee recognise this important fact—that photography has now become one of the ordinary incidents in everyday life, and must, therefore, be subject to the same influences which act upon all other operations of the human mind; so that they trust the forthcoming year may not only be one of activity generally, but will also be rich in important inventions, both in large and small matters appertaining to photography.

Your Committee are pleased to report that upon all other meetings of the members the subjects brought forward have fully sustained the interest and pleasure which have always marked the proceedings of the South London Photographic Society.

Whilst the addition of many new members has strengthened the material position of the Society, they would remind all members that it becomes a duty to communicate to each other the results of observation, and that nothing is too *small* from which to extract something which may possibly turn out to be *large* in its results.

The following papers have been read during the session:—*On Magnitude as an Element of Attraction in Photography*, by the President, the Rev. F. F. Statham, M.A., &c. *On Various Matters Connected with Successful Negatives*, by W. T. Wilkinson. *On the New Collo-Developer*, by W. Brooks. *On the Negative Bath*, by W. Gillo. *On the Difference between Carbon and Collodion Transparencies*, by W. T. Wilkinson. *Further Experiments with Collocine*, by W. Brooks. *On Obstacles to Photographic Progress*, by W. Aldridge. *On a New Application of Sensitive Negative Tissue*, by Leon Warnerke. *The Colours of Photography*, by E. Dunmore. Photographs, appliances, and other matters have been exhibited by Messrs. F. Howard, W. Brooks, W. T. Wilkinson, F. York, E. Foxlee, L. Warnerke, J. T. Taylor, J. Werge, W. F. Henry, J. Middleton, and Adam Diston.

In conclusion: your Committee hope that the prestige of the South London Photographic Society will be maintained, not only by increased activity and possible higher usefulness of its papers and discussions, but, still further, in the direction of more social intercourse and good-fellowship amongst its members.

The Treasurer's report was also submitted, from which it appeared that the financial position of the Society was at least sound, if not flourishing.

The following were elected officers and council for the ensuing year:—*President:* Rev. F. F. Statham, M.A.—*Vice-Presidents:* Messrs. Spiller, Simpson, Hughes, Howard, and Brooks.—*Committee:* Messrs. Aldridge, Ayres, Dunmore, Fry, Foxlee, Nisbet, Warnerke, and York.—*Treasurer:* Mr. Noel E. Fitch.—*Secretary:* Mr. E. Cocking.

It was decided that in future the meetings of the Society should be held on the *first,* instead of the second, Thursday of the month.

Mr. E. Dunmore then read a paper *On the Colour of Photographic Pictures.* [See page 603.]

Mr. ALDRIDGE considered that portraits of large dimensions were best when toned to a warm brown. He was not alone in this opinion, as he found that Blanchard and Adam-Salomon toned their portraits of a decidedly warm hue. There was, however, one objection to the adoption of a brown tone—the pictures frequently faded, and this applied even to some works by one of the artists he had named.

Mr. TULLEY said that tone was a matter of taste, and professional photographers had to consult the tastes and desires of their customers.

Mr. JABEZ HUGHES observed that it was very undesirable to confine themselves to one tone. In landscapes a sunny summer or autumnal scene ought not to be printed of a black and inky tone, but should be of a warm tint, otherwise the picture would fail to convey a correct idea of the scene. And the same in respect of portraiture. For instance: it would not do to tone the portrait of a lady who was fair or *blonde* to a deep black and white, as a brown hue would more correctly convey the true idea of the likeness. In like manner a warm brown tone would not be suitable in the case of a portrait of a lady in mourning draped with crape, or of a clergyman in black robes.

Mr. DUNMORE, in reply, cited the fact of engravings, which were printed with black ink, always giving a truthful representation of people of every kind of complexion.

After a vote of thanks to Mr. Dunmore, it was announced that the following meeting would be devoted to the exhibition of transparencies in the magic lantern. The proceedings were then terminated.

MANCHESTER PHOTOGRAPHIC SOCIETY.

THE ordinary monthly meeting of this Society was held at the Memorial Hall, on Thursday evening, the 14th inst.,—Mr. A. Brothers, F.R.A.S., President, in the chair. After the routine business,

The CHAIRMAN read the following resolutions of the Council:—"That in future the issue of monthly circulars be discontinued except at the discretion of the Secretary." "That membership cards shall be issued to those members only who have paid their annual subscription." He (the Chairman) requested all members who had not already done so to hand in their portraits (signed) for insertion in the Society's album.

Mr. James Young showed a plano-concave corrector, and explained its construction and use.

Mr. Pollitt exhibited two photographs by Professor Piazzi Smyth, the inventor of the corrector, in which the advantages of the instrument were fully shown.

Mr. Chilton exhibited an ingenious filter for collodion.

Mr. Leigh exhibited a sample of new grooves for plate-boxes, in which the separating ribs were formed by inserting slips of veneer into saw cuts.

Mr. LEIGH said he had attempted, but unsuccessfully, to produce the Beechey rings, as described at the November meeting.

Mr. Woodward handed round some lantern slides tinted with water-colour, as recommended by Mr. Ross.

Mr. Noton read a short paper, with practical illustrations, *On the Reduction of Back Pressure in the Oxygen Machine.* [See page 606.]

Mr. Brier showed a new and elegant method of mounting photographs in which two views were placed with their backs together, between two plates of glass, and afterwards bordered with paper in the same way as lantern slides.

Mr. Chapman exhibited one of Bateman's metal fires, which Mr. Atherton said was the most efficient stove he had ever had for the dark room. He (Mr. Chapman) also exhibited one of Watson's sciopticons, and which the members tested against one of Woodbury's (the property of the Society); although the same oil was used in the two instruments, the Woodbury disc was of a purer colour. The prevailing opinion was in favour of the Woodbury instrument.

A vote of thanks was passed to each of the gentlemen who had contributed to the evening's entertainment, and the meeting was adjourned.

BERLIN PHOTOGRAPHIC SOCIETY.

A MEETING of this Society was held on the 20th October last,—Dr. Vogel in the chair.

Dr. WEISSENBORN, in a long speech, discussed the present stagnation in photography, and proposed several means for reviving trade.

Herr LINDE was of opinion that, however they might be situated as regarded skill, the provincial photographers were behind the Berlinese in taste, and that if they were to "pull up" in that respect they might improve their connection.

Herr LEIBMANN thought that the smaller towns were more favourably situated during the present depression than Berlin, for the photographers there were generally as well grounded in their business as their *confrères* of the metropolis, and their outlay for premises, &c., was less.

Herr LINDNER did not approve of Dr. Weissenborn's remedies. He proposed to raise the prices, but the general sense of the meeting was against the proposal.

Herr PRÜMM inquired whether business really was so very dull in Berlin, and was answered by cries of "Yes, yes, indeed," from all sides.

The defects of stereoscopic transparencies and transparencies for windows were then discussed, and serious doubts as to the durability of the latter were expressed.

A discussion upon the etching of pictures upon glass by means of sandblast followed, in the course of which it was stated that the art of etching matt upon glass by this manner was a trade secret only known to certain Parisian houses.

Herr Talbot then placed on the table an album containing two thousand photographic views of scientifically-prepared objects from the animal, vegetable, and mineral kingdoms. These pictures are to be prepared as magic-lantern slides, and the album is intended to serve as a catalogue.

After a short discussion on some points of the carbon process the meeting was adjourned.

AT a subsequent meeting, held on the 3rd November, the only subject of general interest discussed was the cause of the yellow spots that appeared on some of Herren Schulz and Suck's (of Carlsruhe) pictures a short time after being mounted upon mounts taken at random from a particular batch. The misfortune was generally attributed to the impurities in the cardboard, more especially to hyposulphite of soda. To decide the question Herr Prümm sent samples of the cardboard to two experienced chemists, who made an independent examination of it, and reported as follows:—

Professor Wartha, of Pesth, found the body of the cardboard perfectly free from injurious materials or those likely to decompose. On the other hand, he found that the paper with which the side on which the name, &c., was printed was faced had been pasted on with starch containing acid in the highest degree liable to decomposition. He also found that the upper layer of paper containing dilute sulphuric acid turned a solution of iodide of zinc and starch blue, even in the dark; but that this did not take place with the under layers of the card. Repeated washings caused this reaction to become weaker and weaker. On reducing a mount to pulp with distilled water, filtering and evaporating the water in a platinum vessel, one got a yellowish residue, which, when dissolved in a few drops of water, gave a strongly-acid reaction, which was of organic and not of nitrogenic origin. As far as the small quantity of material present enabled him to judge, he thought that the foregoing proved the presence of lactic acid, produced by the decomposition of the starch.

Of the presence of the starch one could easily convince himself by putting a little very diluted dissolved iodine upon the paper, as by this means the paper will become blue. Whether or not the blueing of the iodide of zinc was caused by unremoved traces of chloride of calcium he does not pretend to say, but of one thing he is convinced, namely, that the formation of the spots is solely due to the acid—decomposed starch.

In conclusion: he recommended that, before accepting delivery of a parcel of mounts, one should test them by coating the upper surface of one of them with iodine of zinc and starch, and then dipping litmus-paper into the extract.

Professor Birnbaum, of Carlsruhe, reported that he had steeped a number of the mounts in water, which became slightly yellow and gave a weak yet dicidedly acid reaction. In the fluid the only inorganic substances found were chalk, soda, sulphuric acid, and chlorine. No hyposulphite of soda was detected in the solution. When boiled with muriatic acid there was no discharge of sulphur; on the addition of nitrate of silver there was a white precipitate which was not blackened by heat, and on the addition of chloride of iron the characteristic violet colouring of hyposulphurous acid was not seen. The watery extract of the cardboard, however, contained a very reducing substance. Starch coloured blue with iodine was immediately discoloured by the solution; from an alkaline cupric solution cuprous oxide was precipitated; on warming mercuric oxide with the solution it was blackened; and from an ammoniac-potassic silver solution the watery extract threw off metallic silver; ferrous oxide was quickly changed into ferric oxide, &c. All these reactions indicated organic, reducing substances, oxalic and formic acids, as well as decomposing products of starch or dextrine used to paste the white outer paper to the grey body of the cardboard. Such decomposing products are formed by the action of sulphuric acid upon the starch. Apparently the relatively great gypsum and chloride of sodium contents of the cardboard depended upon

the chloride of calcium used for bleaching the paper, the hyposulphite of soda used for the removal of the chlorine, and the compounds arising from these—sulphate of calcium, sulphuric acid, and chloride of sodium—not being properly washed out. Free sulphuric acid was not present at first, as the watery extract did not visibly discolour ultramarine; but in passing it may have acted, since it is finally present in the ashes of the cardboard.

How the grape sugar may have originated Professor Birnbaum does not pretend to say, but he has demonstrated its presence. Now grape sugar is very favourable to the growth of fungi. In the deepest shadows of some of the pictures sent for his inspection Professor Birnbaum found numbers of white spots with dark centres, which he felt inclined to believe were fungi growths originating in grape sugar, but as they were so thoroughly dry it was almost impossible to decide the fact absolutely either way. At anyrate, the action of this substance, be it what it may, is not to remove the silver from the white spots; for, on examining them by the microscope, the silver is still evidently present, though, having parted with its haloid salts in consequence of the action of the light, it has lost its dark colour and become white, exactly as grey silver becomes white when smelted.

The remedy proposed by Dr. Birnbaum is that photographers should make strenuous representations to the manufacturers to induce them to face the mounts with clean paper, and to paste it on with some adhesive material not liable to such decomposition.

The cardboard manufacturer ascribed the injury to the mounts to the dampness of the place in which Herren Schulz and Suck stored them; but they contend that the same fault did not show in other mounts stored in the same place, while it did show in the same mounts in the hands of others.

Herr Prümm recommended the saturation of a clean mount with a weak solution (say 1 to 500 or 1,000) of hyposulphite of soda in order to see how the picture would suffer.

Herr Marrowskey proposed to distribute the remainder of Herren Schulz and Suck's mounts amongst the members present for experimental purposes.

Herr Grüne said that grey sorts of paste bleached with sulphuric acid were often used in cardboard manufactories.

Herr Rückward thought it better to use gelatine instead of paste. The meeting separated shortly after the conclusion of the discussion.

VIENNA PHOTOGRAPHIC SOCIETY.

This Society met on the 17th October,—Dr. Hornig occupying the chair as usual.

Amongst a number of other articles laid on the table by the President were several numbers of the publication called *Men of Mark*, illustrated by Woodburytypes, which were much admired; and a series of ethnographical studies in China, presented by Baron Stillfried to the Society's Wander album.

The Secretary (Herr Fritz Luckhardt) mentioned a communication, which he had received along with a specimen print and some pieces of paper for trial, from Herr Friedlein, of Munich, with reference to his carbon tissue, for which he claimed a superiority on eight points over the tissue of English manufacture.

The President said that, as requested, he had sent pieces of the paper for trial to several members of the Society, but as yet he had received no expression of opinion about it from them. He, therefore, hoped some of those then present would take pieces with them and report at the next meeting.

Dr. T. M. Eder then gave an account of the new experiments with intensification with lead, which he and Herr V. Tóth had carried out together. [See page 580 in number for December 8, and page 605 in present number.]

Herr Riewel then described, by request, the various difficulties he encountered, during the summer months, in the production of carbon transparencies. He displayed a series of transparencies, in which these faults and hindrances could be observed, as well as a second very successful series which he is preparing for Herr Kroh. Herr Riewel remarked that, after a series of patiently-conducted experiments, he had attained a considerable degree of certainty in the preparation of perfectly-clear carbon transparencies, and he especially recommended the addition of a small quantity of sulphuric acid to the transferring water. He further remarked that the certainty of success depended upon the following out of a series of precautions and upon the greatest cleanliness of manipulations. He also described his method of working, and expressed a wish that his communications should induce those of his professional brethren who had given up the study of the carbon process in consequence of failures at first, to resume their experiments and convince themselves of the superiority of the process.

Herr Ritter v. Stefanowski then discussed the advantages of increasing the artistic effect of landscape pictures by the employment of cloud negatives, especially of those produced by printing in carbon upon sheets of gelatine. He showed several of these cloud negatives, and compared them with some prints hailing from Paris, in which the clouds were printed in by means of cotton wool.

At the invitation of the President,

Herr Winter, of Prague, gave a sketch of his enlargement process. He takes his enlargements upon iodide of silver, like collodion negatives, by artificial light, with an exposure of a few minutes, and then developes them. He is of opinion that they ought to stand longer than ordinary pictures upon salted paper. The image is projected by electric light from a *carte*-sized negative through a lens, upon a screen upon which a sheet of prepared paper is fixed. After a short exposure these paper positives are shut up in a dark box until it is convenient to develope them.

The President then laid copies of the following new technical works upon the table, and made a few remarks upon each:—*A Catechism of Photography*, by Dr. Julius Schnauss; *the Carbon Process*, by Dr. Liesegang; *Photography: a Hand-book*, by Julius Krüger; *a Practical Treatise on Carbon Photography*, by Dr. D. van Monckhoven; and *Light as the Servant of Scientific Research by Photographic Means*, by Dr. Stein.

Some local business was then transacted, after which the question-box was opened, and found to contain two questions, both referring to Herr Matzner's new process. They ran as follow:—Who knows of a certain method for sunk etching upon metal? and to whom is Herr Matzner's process known? 2. Is there a photographic method suited for the production in a short time (say twenty-four hours), of several hundred *carte* pictures in printers' ink? or, does anyone know anything of Herr Matzner's new process, which is rumoured to be *phototypometric?*

As no one present could give the desired information, Dr. Hornig undertook to communicate directly with Herr Matzner, and invite him to give any explanation or particulars he might think desirable with reference to this process, and also to exhibit to the Society any results he might consider favourable. The meeting then separated.

Correspondence.

WARM DEVELOPMENT, &c.

To the Editors.

Gentlemen,—I have been trying Lieut. Lysaght's method of warm water development for gelatine plates, but find only very little gain of sensitiveness, also that leaving out the bromide answers the same purpose. Of course this is as one would suppose, as on the weather becoming warmer we add more restraining bromide to the developer.

I may be wrong, but I think that the worth of Lieut. Lysaght's method lies in being able to work gelatine films when the temperature of the air is high. I do not think much advantage will be gained by making artificial warm weather; better leave out some of the bromide.

However, with the gelatine plates I have experimented with I do find much increase of sensitiveness when all the bromide is left out of Kennett's formula for developer, only about as much as when warm development is used with the restraining bromide.

I do not find the four-grain solution of pyrogallol, or, indeed, a ten-grain solution of tannin, causes insolubility to such an extent as I had been led to expect. In trying some plates which had been prepared by an alcoholic emulsion I found pyro. and tannin solutions to have no apparent action, the films being dissolved at 90° Fah. With plates prepared in the ordinary manner, but which had been kept some months, I have succeeded better, but it seems dangerous to exceed 90° Fah. However, I am inclined to believe, from what I have noticed, that plates—at anyrate under some conditions—become less soluble by keeping, so that, perhaps, the solutions cannot enter the films sufficiently easy to harden them. I have also found that such a plate may be placed in the warm water without dissolving.

I have not been able to utilise the alcoholic emulsions on plain glass, owing to the well-known repellent action of stronger solution of alcohol on weaker ones, the effect being to drive the emulsion to the sides of the plate, as, I presume, those parts lose alcohol by evaporation more quickly than the centre of the plate. The plates are also subject to "marbling" marks. The more thinly a plate is coated with such an emulsion the more even will be the film. I may, however, state that an emulsion prepared with excess of silver converted by soluble bromide would not bear anything like so large a proportion of methylated spirit as that to which spirit is added before the addition of the excess of silver, followed by the soluble bromide. These results are curious.

Unless the tannin and pyro. solution you recommend shrinks up the wet film to something like the thickness of the dry film, I do not think results will be obtained equally sharp as with the latter. When I first began to experiment with gelatino-bromide and gelatino-chloride I often exposed wet films, and I found the characteristic of the negatives was excessive softness and "fuzziness." I also did not find that the films were necessarily damaged by the developer, though I have no doubt that your solution will be an improvement here too. But, granted that there is no gain of sensitiveness when the plates are used undried—and I think this *is* granted—there will be, in my opinion, no advantage gained by this mode of preparation. The fact is, unluckily, gelatine emulsion, unlike collodion emulsion, cannot be kept with certainty any length of time. This being so, it will not answer to prepare some ounces of emulsion wherewith to prepare a plate or two at a time. The only way is to dry the emulsion at once on the plates, keeping them in stock for any emergency.

But can it be that moistening a dry or wet gelatine plate with pyro. or tannin prevents the evils arising from the decomposition of the gelatine? Or, again, does Epsom salts, or sulphate of magnesia, do the same? If so, we are well out of the principal trouble to be met with in the gelatine progress.

I advocated a year or two ago the use of chrome alum for this purpose, but abandoned it, thinking that it made the film too impervious to the developer, and also because I did not think it quite "an infallible cure."—I am, yours, &c., HERBERT B. BERKELEY.

Cotheridge Court, Worcester, December 19, 1876.

COLOURLESS FRENCH POLISH.

To the EDITORS.

GENTLEMEN,—In reply to Mr. H. Cooper's query, I beg to say that white French polish may be obtained from Mr. Rae, Wardour-street, Oxford-street. It is applied with a rubber of cotton-wool in a piece of rag, with a slight touch of linseed oil outside the rubber to prevent sticking.

For the purpose required I think a better plan would be to give the wood two coats of clear size, and afterwards varnish with white paper varnish, letting the varnished wood dry in a horizontal position away from dust.

If it be intended to place the wood in water to develope the carbon print upon it, the back should be protected by rubbing in a little linseed oil; but if from a non-reversed negative, the print could be transferred from a piece of Sawyer's temporary support. Of course the print or the wood in this case must be coated with gelatine before the final transfer.—I am, yours, &c., H. J. BURTON.

Tyne Villa, Hanwell, W., December 16, 1876.

PHOTOGRAPHY UNDER GROUND.

To the EDITORS.

GENTLEMEN, I have read with much interest the recent articles and correspondence on the above subject. I believe that Messrs. Jackson Brothers, of Oldham, were the first persons who ever attempted to take views of the workings of a coal mine through the aid of magnesium wire.

In May, 1865, my father and uncle, at the request of a member of the Manchester Geological Society, descended the Bradford Colliery, Manchester, for the purpose of testing the capabilities of the magnesium wire (which had then been but lately invented), and obtaining views of the workings. They were accompanied by Mr. Livesey, of the Geological Society, and others. Four negatives were taken by the ordinary wet-plate process, and, although they succeeded in getting only moderate results, I believe if the smoke from the wire could have been conveyed away better results would have been obtained. The plates were exposed from six to seven minutes, and had it not been for the smoke they might have been exposed much longer, as they were not affected by the temperature.

The greatest difficulty which my father had to contend with was that when the wire had been burning for six or seven minutes it sent forth a dense smoke which at once filled the mine, notwithstanding the efforts of the miners to force it away, and prevented further exposure of the plates. Copies from the same negatives were exhibited before the Manchester Geological Society soon after the experiments. I may say that the mine which was the scene of experiment was only four feet high. I shall be glad if you will kindly insert this letter in your next issue.—I am, yours, &c. VERNON L. JACKSON.

Clegg-street, Oldham, December 16, 1876.

WHITE FRENCH POLISH.

To the EDITORS.

GENTLEMEN,—In reply to the request of Mr. Henry Cooper for a receipt for white French polish, I beg to offer the following as one that I can strongly recommend:—

Procure some bleached shellac (which can be obtained from Mr. J. Fallowfield, Lower Marsh, Lambeth), and of this dissolve enough in methylated alcohol to make a solution of the consistence of collodion. This forms the polish, which ought to be applied in the following manner:—

Make a tuft of cotton wool of the size of a walnut. Cover this with a piece of ordinary *old* calico; but observe that the cotton wool must, previous to applying the calico covering, have been well charged, so as to be nearly saturated, with the alcoholic solution of bleached lac just mentioned. Upon this calico covering must be applied a *little* raw linseed oil, the usual way of applying this being by the tip of the finger. The object of this application of linseed oil is to make the rubber work smoothly; hence, if there be too much oil it will work in a greasy manner, and if too little it will be "sticky." In the former case the polish will not adhere; in the latter the rubber will not work.

The rubber thus prepared is applied with a circular motion until the polish contained in the wool is expended. The wool can be re-charged as often as is required; but at night throw it away, and provide a fresh tuft for next day's work.

In making the solution of bleached lac in the methylated alcohol it will be seen that a flocculent precipitate is formed. As this precipitate is not merely useless but injurious, it is advisable that the solution be allowed to stand for some days after the lac has been dissolved in the alcohol, and that the clear portion only be decanted for use.—I am, yours, &c., W. M. AYRES.

1, *Boundary Villas, Royal Crescent, Notting Hill, W., December* 15, 1876.

To the EDITORS.

GENTLEMEN,—To produce white French polish, dissolve any quantity of newly-bleached white lac in the following proportions:—

White lac .... 28 ounces.
Methylated spirits (not less than 60 over-proof) 1 gallon.

If the lac has been bleached for any considerable time, and been exposed to the air and light, a certain amount of insolubility is created varying with the exposure, and this must be allowed for by adding more of the bleached gum lac. After solution filter, or allow it to settle, and decant; but the result is not affected by the comparatively muddy appearance of the solution.

Another method, which produces a very superior result, is the following:—Select a quantity of perfectly clean and transparent pieces of gum copal, and scrape off the outer rind of oxidised gum, which keep for coarser purposes. Now melt the selected pieces, taking special care not burn the gum, which, if burned or scorched, would be destroyed. When fully melted pour it from a height into water; repeat this twice, drying the gum each time; then dissolve in the same proportions as directed for the white bleached lac, adding a lump of camphor, which facilitates solution. Filter or decant, and it is ready for use.

Either of these make a perfectly hard and crystalline negative varnish as well as white French polish, and the latter, if well made, is as transparent as water or castor oil.—I am, yours, &c.,

Edinburgh, December 18, 1876. W. H. DAVIES.

THE LATE PHOTOGRAPHIC EXHIBITION.

To the EDITORS.

GENTLEMEN,—I pass over the personalities contained in Captain Abney's letter in your last number, and proceed at once to the questions at issue.

As to whether my article was "worthy of type" or not was a matter for the consideration of the Editors. I look upon the comments on this point as a reflection upon their judgment, and not calling for defence from me.

From the heated tone of Captain Abney's remarks one would imagine that to suggest to the "distinguished corps to which he has the honour to belong" that they had "tilted their camera," was to charge them with the most heinous offence of which they could be guilty. Captain Abney says that the camera was not "tilted." I readily admit it, *i.e.*, in the direction which he evidently has in his mind, viz., *upwards;* but cameras can be "tilted" in other directions beside upwards, and I can assure Captain Abney that I am not such a neophyte in photographic matters as to be unable to distinguish between distortion produced by a "tilted" camera and that produced by time.

As regards the "offending figure," it would be useless to argue the point with a gentleman who is prepared to maintain his own opinion against anyone of a lower grade in art than a "Royal Academician;" but I beg to submit that had the figure in question (poor fellow! he little thought that he was going to attain such notoriety!) been placed so as to appear approaching the bridge and so coming (so far as I can charge my memory) against the sky, and thus giving a balance to the dark foliage on the opposite side, the picture would have been improved.

I was fully aware that something was wrong with the clouds in the picture, to which I presume Captain Abney alludes, but passed this over out of consideration for its other good points.

Altogether, I am quite content to abide by the verdict of other visitors to the exhibition than Captain Abney as to the general truthfulness of my remarks.—I am, yours, &c., THE WRITER OF THE ARTICLE.

December 18, 1876.

Miscellanea.

PIRATING WORKS OF ART.—At the Brighton Police-court on Monday last, the 18th inst., Mr. Benjamin Brooks, fine-art publisher, of Oxford-street and Great Portland-street, London, prosecuted a local bookseller and dealer in prints, named Edgar Swane, carrying on business in a leading thoroughfare near the railway terminus, to recover six penalties of £10 each for selling pirated photographs of the popular engravings, *Grace Darling* and *The Reaper*. Prosecutor, who appeared to conduct and prove his own case, said the prosecution was under the 6th section of the Copyright Act (Vic. 25 and 26, c. 68), and he had felt compelled to initiate the proceedings owing to the great and perpetual injury inflicted on him by dealers selling such photographs. He had in 1870

given £1,000 for the copyright of *Grace Darling*, and pirated copies were being sold far below the cost at which they could be legitimately produced, a print being sold for sixpence which he, who held the copyright, could not sell for less than eight guineas. The number of the photographs sold was very large; in fact, defendant's wife had herself said she could not obtain them fast enough. They were prepared in Boston, America, and were distributed over this country by Jew pedlars at, perhaps, a penny each. A case concerning the same picture was tried in London in 1870, when there was a conviction; and lately the injury inflicted on him had grown to such proportions that he had decided to again prosecute as a warning to others. With this view he would consent to a penalty in a single case. The Bench accordingly convicted defendant on one charge only, fining him £5 or a month's imprisonment; and as a return for prosecutor's leniency defendant promised to give up the names of the parties who supplied him with the illegal copies.

Photography in Court: a Club Portrait at Fault.—At the Bloomsbury County Court, the case of Rudford against Evers was heard before Mr. Judge Russell, in which the plaintiff, described as a clerk in the London and North-Western clearing house, sued the defendant, a photographer, of Kentish Town, to recompense him the sum of twenty-one shillings for money he had paid in respect of a portrait club of which the defendant was the ostensible proprietor. Mr. Charles Williams, who appeared as solicitior for the plaintiff, said that his client was in a public-house in Kentish Town where the defendant was, who induced his client by the production of a well-coloured, framed, and mounted photograph to become a member of his club by payment of one shilling a week, on the assurance that he would have a portrait finished equal to the one shown and a dozen *cartes* besides. His client paid the stipulated fee, but instead of being finished like the one he had seen it was a very coarse, highly-coloured piece of art, and by no means a faithful resemblance. In consequence of this his client returned the photographs and demanded his money, which the defendant indignantly refused to refund; hence the present action. The plaintiff corroborated his solicitor's statement, adding that the portrait was so highly coloured and so red in the face that it gave him an appearance to which he strongly objected, as he was a very abstemious man. This was the plaintiff's case. The defendant said that the portrait was an excellent one both in pose, fidelity, and colouring, and being so the plaintiff ought to have been satisfied with it; therefore he decidedly declined to return any money. The defandant called a brother photographer in support of his case, who corroborated this statement. At this stage of the proceedings the learned Judge had the portrait produced in court, and upon examining it and comparing it with the plaintiff considered that it was not a work of a very high character. The plaintiff, considering the very small sum paid for it, ought to be reasonably satisfied with it, and, therefore, his Honour said he must give judgment in favour of the defendant, to whom he allowed his costs.

A Large Photograph of the Philadelphia Exhibition Buildings.—Mr. F. Gutekunst, photographer, has recently completed a photograph of the exhibition grounds, which is probably the largest photograph on a single sheet of paper in the world. Its merits, as a panoramic view of the buildings, are no less worthy of notice than its great size. The sheet of paper on which it is printed is ten feet long and eighteen inches wide, and special baths for the silvering and toning of this large sheet had to be made. The negatives from which it was printed were exposed from a scaffold erected near the Belmont reservoir, and seven of them carry the view of the buildings from Agricultural Hall to the Observatory on George's Hill. The buildings are shown with great distinctness, and without any glaring faults of perspective, so apt to be displayed in photographic views. The difficulty in the way of printing a picture of this size from seven negatives on a continuous sheet of paper are very great. The whole sheet must first be silvered. A section of it is exposed under one negative until printed, and then a second section is printed, and so on until the picture has been completed. The lines of the picture (parts of which may be found on two negatives) must be accurately joined—no double exposure can be permitted else a dark line will show the junction of two negatives—and, finally, each of the seven prints must be made of the same depth of colour. This is largely a matter of judgment, for the pictures are always printed much darker than they are intended to appear when finished, and the time of exposure affords no certain guide to the depth of colour, because the degree and power of light change with every passing cloud and with every hour of the day. But after the printing has been completed the toning with gold must also be evenly done, otherwise the blacks will be of a bluish cast in one part of the picture and of a red tone in another part. It is, besides, extremely difficult to handle such a large sheet of paper as it passes wet through the washing processes, the toning and fixing baths, &c. With all these difficulties standing in the way of the successful printing of a panoramic view of this kind, it is surprising to find that there is scarcely a trace of the junction of prints from two negatives, and that the whole picture is uniform in colour and tone. The point of view has been well chosen for the purpose of grouping together all the principal buildings, and the picture is a most interesting *souvenir* of the exhibition.—*Philadelphia Public Ledger*.

EXCHANGE COLUMN.

Will exchange Sutton and Dawson's *Dictionary of Photography*, last edition, for the latest edition of Captain Abney's *Instruction in Photography*.—Address, F. M. Sutcliffe, Whitby, Yorkshire.

Wanted, a 5 × 4 instantaneous doublet (Ross or Dallmeyer), in exchange for a powerful medical coil, with three powers and sundries, and Bunsen's battery complete.—Address, M. Newman, 21, Marsden-square, Manchester.

A Ross's No. 5 symmetrical lens and Wheeler and Wilson's genuine sewing machine, given in exchange for Dallmeyer's rapid rectilinear lens for whole plates, or similar lens by any good maker.—Address, Wright Brothers, Northampton.

ANSWERS TO CORRESPONDENTS.

☞ *Correspondents should never write on both sides of the paper.*

H. C.—Try the following:—First surface, 1·7 inch radius; second surface, 4·5 inch radius.

Exhibitor.—In the production of the picture double printing was had recourse to; and this method you also must adopt.

W. P. B.—We are aware of a nearly similar case occurring in London about two years ago, in which the photographer obtained compensation.

A Novice.—The fact of the sensitising bath being discoloured will not injuriously affect the prints unless it leave a permanent stain on the paper, which is not likely to be the case.

G. A. W. J.—Reticulation in the collodion film is due to other causes than the presence of water in the ether. We advise you, however, not to waste time in attempting to "doctor" the very small supply you have in stock, but at once to procure a fresh supply from any manufacturer of recognised standing.

Tycho.—Let the daguerreotype be removed from its setting, and washed, or rather *wetted*, by water. Next apply a ten-grain solution of cyanide of potassium, by which the coloured stains will be immediately removed. Let this be succeeded by a rinsing in plain water followed by distilled water.

Verbosa.—You have confused the two; the British Medical Association and the British Association for the Advancement of Science are quite distinct organisations. When the "British Association" is spoken of, the latter of these bodies is always understood. Anyone can become a member of it by making a payment for the first year of two pounds, and a payment afterwards of one pound annually.

J. M. A.—We have not the least doubt concerning the cause of the bad quality of the negatives. If you carefully examine and test the distilled water it will be found to be contaminated with organic matter. Make a weak solution of permanganate of potash, and, having poured some of the water into a test-tube, add to it a drop of the permanganate. It will produce a delicate pink colour, which, if it disappear, will indicate the presence of organic matter.

R. J. W.—Rectify your alcohol by mixing with it a handful of carbonate of potash previously pulverised and dried. Agitate this mixture well, and allow it to settle for a short time, by which the water will be left at the bottom of the vessel. If strict purity be not required you may use the alcohol treated as above, first carefully decanting it from the solid and fluid precipitate. The fluid at the bottom, we need scarcely observe, is an aqueous solution of carbonate of potash. If, on the other hand, the spirit must be pure, it will be necessary to distil it.

New Subscriber.—Sunning the bath will confer no advantage upon the bath so long as it remains in its present state. On examining the sample sent we found it to be *very* acid. Proceed as follows:—Make a strong solution of bichromate of soda and add it, little by little, to the silver bath, shaking the latter after each addition. Continue to add the soda solution until the bath becomes permanently opaline or *slightly* milky. If now a piece of litmus paper be immersed, it will be found that all traces of acidity have disappeared. Then filter the bath, place it in the sun for a few hours, and it will in all probability work as well as it has ever done. You ought also to test its strength, and add either nitrate of silver or distilled water until it registers about thirty-five grains to the ounce.

J. H. T. E. writes:—"Can you tell me of any proved method of carrying dry plates a distance when they would be subjected to the roughest of rough usage, jolting to a degree over bad roads, and yet in a compact form and easy to exchange at the end of a day's march? There is, no doubt, among your many photographic acquaintances some who have overcome such difficulties. My idea is to *screw* them tight into a box and then put this into another strong one, fitted inside with small india-rubber balls which would act as springs on every side. Do you think such would effectually prevent breakage?"——Reply: Plates may be kept either in double dark slides or in a plate-box. In the former case the pressure of the springs on the back will prevent the plates being shaken, no matter what the roughness of the treatment to which they may have to be subjected. In the latter case the plate-box, which may with the greatest advantage be of the "changing-box" form, ought to have a movable pad or soft buffer, which, by means of a button on the outside, can be pressed hard against the ends of the plates. We have known this to answer very well.

☞ Editorial Communications should be addressed to "THE EDITORS"—Advertisements and Business Letters to "THE PUBLISHER"—at the Offices, 2. York Street, Covent Garden, London, W.C.

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THE BRITISH
JOURNAL OF PHOTOGRAPHY.

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THE PAST YEAR.

Once more the duty devolves upon us of presenting to our readers an epitome of the results of the year now passing away, and once more we are brought face to face with the ever-increasing difficulty of the task. That photography is annually working its way more and more into general use and extending its sphere of utility is a fact which requires no repetition here, for almost weekly we find fresh channels opened in which our art-science, either directly or indirectly, is made to perform its part with advantage; but when we come to search for results of a progressive nature in the theory or practice of photography itself we find little to record in the way of new discoveries or improvements in existing processes. This, as we have pointed out on previous occasions, is but what we have a right to expect; for we are now past the stage of *great* discoveries, such as revolutionise the theory or practice of the art, and must be content to chronicle the minor improvements upon previously-existing ideas and processes which are so necessary to the completion and perfection of the work of the original discoverers. In this respect the year 1876 has not been behind its predecessors, as the following summary will show; but want of space precludes our devoting more than a passing remark to matters which are fully deserving of much greater notice than we can give in this place. They will, however, be found fully treated elsewhere in our volume now closing.

We find ourselves somewhat at a loss in deciding where to commence; we shall, therefore, treat first that branch of the art which has attracted most attention, and undergone more improvement than any other during the year, namely, emulsion photography. Some of our readers have suggested that we have latterly devoted to this subject more than its due share of attention; but, be that as it may, we must remind those who are not personally interested in the use of emulsions that we are not altogether free agents in the matter, but are compelled to follow public opinion. If the public express a desire for information on the subject, we must give it; if our contributors *will* write upon emulsions, we must find space for them; and, while filling our columns with what appears to be the topic of the period, we are steadily increasing the store of knowledge. To those who are discontented in this matter we say:—"Show some little interest in your own particular subject, publish your ideas and practice, and thus provide, not only ourselves, but the photographic community generally, with matter to discuss, and you will not find your 'hobby' left 'out in the cold.'" But it is only natural that the subject of emulsions should at the present time exhibit greater vitality than other and older processes. Emulsion photography is not yet out of its infancy; and, though it has progressed with rapid strides during the last few years, the general body of photographers are only now commencing to recognise its value. Thus it arises that for the time a greater interest is evinced in this than in any other processes.

Mr. Warnerke and Colonel Stuart Wortley in the early portion of the year devoted considerable attention to the emulsion question; the latter gentleman, at a meeting of the Photographic Society of Great Britain, recommending the use of sulphuric acid in place of nitric or hydrochloric acid, with the object of increasing the density of the image—a result which is ascribed by Colonel Wortley to the formation of sulphate of silver. The desired end is fully attained, but whether it is due to sulphate of silver or not we are not prepared to say, a curious feature in the case being that, though the addition of sulphuric acid to an aqueous solution of silver nitrate produces no precipitate, the acid, when added to collodion or to a mixture of ether and alcohol containing dissolved silver, produces a fine, white precipitate, to which, whatever its nature, the improvement in the emulsion is due.

Mr. Warnerke, at a later meeting, described the results of his experience with the organified pyroxyline—almost identical formulæ for the preparation of which were published nearly simultaneously by Colonel Wortley and Mr. J. W. Gough. The "organifying" consists in impregnating the cotton with gelatine, and drying previous to its treatment with nitro-sulphuric acid, or the gelatine may be dissolved in the acids. The resulting pyroxyline is stated to be very soluble, and to conbine the qualities of rapidity and density in an eminent degree. Colonel Wortley also recommends the addition to the emulsion of gelatine previously dissolved in nitric acid, for the purpose of bringing about a result similar to the organified cotton; this he considers superior to glycocine (as suggested by Mr. M. Carey Lea), which, he states, acts injuriously upon the sensitiveness. These two gentlemen appear to hold diametrically opposite opinions of the properties of glycocine, or glycocoll, when used in emulsion or as a preservative—Colonel Wortley alleging that it gives a *slow, dense* plate, while Mr. Lea finds it conducive to *rapidity and thinness.* Another method, which Colonel Wortley recommends, of introducing gelatine into the collodion emulsion, consists in using the dried gelatine pellicle, which is alleged to be perfectly soluble in warm alcohol; this appears to offer greater advantages than any of the other methods.

Mr. Warnerke also contributed an account of an exhaustive series of experiments with the bromides of different metals—a line of research which has hitherto received too little attention. The general result of a large number of experiments was that in point of rapidity, density of image, colour of deposit, and sensitiveness to the rays of lower refrangibility the bromide of zinc is superior to any other, the cadmium salt coming next. Colonel Wortley subsequently published the results of his researches in a similar direction, from which he draws the conclusion that all the bromides are equal in point of sensitiveness, but require different periods to acquire full rapidity; manganese attains this end in the shortest time, cadmium being next, while zinc stands fifth on the list.

Mr. M. Carey Lea introduced a modification of the washed emulsion process, consisting in washing and organifying the emulsion in the liquid state, instead of first allowing it to set. This is effected by stirring it into the emulsion, contained in a deep jar, a sufficient quantity of the organifier to precipitate the whole of its solid constituents; but as the only gain claimed is the saving of a little trouble, and some uncertainty appears to exist—here at least—as to the success of the operation, it has not been generally adopted. Mr. J. Johnston has also brought out a new emulsion process, the main feature of which is the use of a double salt of silver and ammonia, in place of the plain nitrate. It is, however, a secret process, and as we have treated it so fully recently we need say no more here.

Almost as the year closes Captain W. de W. Abney has made public what promises to be a most important and valuable discovery, namely, that a very rapid emulsion incapable of giving density may be made to produce perfect negatives by simply recoating the plate, previous to development, with a slow but dense emulsion, a film of albumen or gum arabic being interposed to prevent solution of the under film. In this manner the properties of the two emulsions are stated to be combined—a result which must prove of great utility. At an early period we shall examine the question minutely.

Turning now to the gelatine emulsion we find that a corresponding amount of energy has been shown in perfecting the working details. The Rev. H. J. Palmer, who is well known as a successful worker of this form of emulsion, read a paper before the Edinburgh Photographic Society, comprising a complete account of the working details and apparatus employed in his own practice; while two other contributors to our columns, who prefer to write under the *noms de plume* of "F. S. K." and "Franklin," have described methods possessing variations of detail which distinguish them from the original process. The principal feature in the modification of the former gentleman consists in the use of an organifier in the emulsion, or, more properly speaking, *organifiers*, for three are used—pyrogallic and gallic acids and catechu—the result being a considerable increase in the density of the image. The peculiarity in "Franklin's" method rests in the employment of a slight recess of silver, by which a high degree of sensitiveness is conferred; it is worthy of note in this connection that a small excess of less than a grain to each ounce produces greater sensitiveness than a larger quantity, which is directly opposed to the theory held by some of the workers of collodion emulsions. More recently Lieutenant Lysaght has described a means of rendering hot development practicable, and which is stated to lead to greater rapidity. The plate is allowed to soak for a short time in a solution of pyrogallic acid instead of plain water previous to development—a course which results in a decrease in the solubility of the gelatine film. Before quitting this subject we must mention the indefatigable researches of our able contributor Mr. H. B. Berkeley, who is always to the fore in questions connected with emulsion.

In matters of chemistry connected with our art, perhaps the most important novelty of the year is Mr. M. Carey Lea's new collo-developer, which is an improvement upon the ferro-gelatine developer introduced by him nine or ten years ago. This preparation, which has been found to answer so well that it has become an article of commerce under the name of "collocine," is made by boiling gelatine for a lengthened period with dilute sulphuric acid, and afterwards neutralising the mixture with metallic zinc. The finished liquid is endowed with most extraordinary restraining power, which Mr. Lea ascribes to the formation of a compound sulphur acid by the reaction of the sulphuric acid upon the gelatine, and not to the presence of glycocine and leucine which are formed simultaneously. The former of these substances he has found by experiment to be entirely without restraining power.

The same gentleman has also published some notes upon the employment, for various purposes, of glycocine or gelatine sugar—a crystallisable product of the action of sulphuric acid on gelatine. As an addition to the printing bath it is found to reduce the exposure to one-half, while the paper darkens to a richer colour without bronzing, the action of the gold bath being facilitated and the tones produced suffering less reduction in the hypo. Employed as a preservative for dry plates it increases sensitiveness, but its effect when added to an emulsion is so slight as to be of little value.

Mr. Lea has further introduced a new method of intensification based upon the use of chloride of gold, followed by the ordinary alkaline developer. During last year we published a method of using chloride of copper to first bleach the image, which is then thoroughly washed and treated with an alkaline solution of pyro.; the two operations result in the formation of an image composed of silver in combination with a trace of copper, which adds greatly to the printing value of the negative. We have found by experiment that Mr. Lea's modification—which is identical in principle—offers no advantages over the copper except when the difference in the colour of the deposit may be of value. When the copper salt is used the colour varies from a warm brown to a neutral black according to circumstances; the gold salt gives almost invariably a purple-black. Another intensifying process, introduced on the continent by Herr J. M. Eder and Captain Victor Tóth, consists in the employment of a solution composed of nitrate of lead and ferricyanide of potassium, under the action of which the image is converted into ferrocyanide of lead; this is again treated with sulphide of ammonium, which changes it to a dense black. We have not heard that the method has been adopted to any extent here.

Mr. J. Spiller brought before the notice of the members of the Photographic Society of Great Britain a method discovered by Mr. Francis Jones, of Manchester, of producing prints by the action of antimoniuretted hydrogen upon paper impregnated with sulphur. The impression is composed of orange sulphide of mercury, which is disagreeable in colour, though it may be modified by treatment with other substances. The process presents no features calculated to render it useful, and in view of the dangerous character of the antimoniuretted gas it is not likely to rank higher than a mere chemical curiosity.

In carbon and other permanent forms of printing there is little to record beyond a steadily-increasing application of the different processes, not only to the daily requirements of the professional photographer, but also to the purposes of book illustration and other branches of industry. The simplicity of manipulation and certainty of results of the carbon process when once mastered, combined with the variety and beauty of the effects obtainable, render it more than ever certain that the time is not far distant when silver printing will be entirely superseded—at least for the purposes of the professional photographer. A question which was raised as to the stability of the pigments employed in colouring the tissue having been satisfactorily answered by the Autotype Company, no reasonable doubt can exist as to the permanence of such prints. In the practical working of the process Dr. van Monckhoven has published some valuable observations upon the relative effects produced by acids and alkalis in the sensitising bath, and, as we have recorded on various occasions, we have derived considerable benefit therefrom.

Mr. L. Warnerke has described two new applications of his flexible substitute for glass for outdoor work, namely, in the production of panoramic and combination pictures. In the first case, the tissue is exposed in successive lengths in the roller dark slide; the camera, being accurately levelled, is revolved upon its centre, so as to include a different portion of the subject at each exposure. In the other, the different negatives are superimposed in proper position, and the outlines cut with a pair of sharp scissors; the portions of each negative to be utilised are then arranged upon a sheet of glass, so as to form a single negative, the nature of the tissue rendering this a matter of the greatest ease. While on the subject of glass substitutes, we may add that Mr. M. Cary Lea recommends the employment for this purpose of thin paper saturated with india-rubber; this is simple, and for some purposes, no doubt, sufficiently effective.

Mr. Young, of Manchester, and Mr. Birrell, of Glasgow, have each patented an "oxygen machine," the former being an improvement upon that of Mr. Noton introduced some years ago. The latter is a self-acting arrangement, intricate in detail, intended to regulate, automatically, the formation of the gas, and thus lessen the chance of explosion. Both machines will be found fully described in our pages.

Dr. van Monckhoven alleges that by using a double window in the dark room a non-actinic *white* light is obtained which is much more pleasant and less injurious to the eyesight than the orange and ruby glass in general use. Our own experience and that of others, however, does not corroborate this.

In the department of artistic photography Messrs. Brown and Barnes, of Liverpool, and Mr. Warwick Brooks, of Manchester, have each brought out a novelty known respectively as the "mezzotint vignette" and the "academy portrait." The former consists of an ordinary vignette, the shaded portion of which forms a delicate stipple resembling morocco leather; in the latter the portrait is surrounded by a tastefully-designed frame printed-in from a separate negative. Both forms are extremely effective.

During the year the great Centennial Exhibition has been opened and closed. Photography appears to have been well represented. At the exhibition of our own "parent" society the exhibits are generally considered to have been below the average of former years—indeed, the society, in spite of its recent reorganisation, appears to be in anything but a satisfactory state as the representative photographic society of the kingdom. Let us hope that in the coming year an improvement may be initiated.

We are glad to have to chronicle the formation of a new society, or rather the resuscitation of an old one, under the name of the Bristol and West of England Photographic Society. There should be abundance of material in the district to support it, and we conclude by wishing success to the young society, and to our readers and the "fraternity" generally—

A Prosperous New Year.

HYDROGEN, AND ITS SUBSTITUTES FOR THE LIME LIGHT.

Having recently devoted an article to the description of a method by which oxygen can be manufactured and supplied while being consumed, it is only fitting that we should do the same in connection with hydrogen; for, in the production of the lime light, oxygen, it is scarcely necessary to observe, will not answer by itself.

During a long period hydrogen used from a bag and under pressure was deemed essential to the production of the lime light; but in virtue of a discovery made at the establishment of Messrs. Horne and Thornwaite, namely, that the flame of a spirit lamp would prove a very efficient substitute for the flame of hydrogen, the "oxy-calcium" light eventually received a great share of popular favour. This light is produced by a stream of oxygen being blown through the flame of a spirit lamp before impinging upon the lime. A still farther step in advance was made when it was found that ordinary carburetted hydrogen as supplied for domestic lighting also proved a valuable substitute for the pure hydrogen. And it is now known that air-gas—by which we mean that produced by the transmission of air through one of a variety of hydrocarbons, of which benzoline may be accepted as a type—also answers this purpose.

When making use of the lime light recently it occurred to us that pure hydrogen could be easily produced under circumstances similar to those under which we, only a short time since, described oxygen as having been made, namely, while the lantern exhibition was going on. This, we are very well aware, is no new idea, for it has already been referred to in articles in this Journal.

In the absence, however, of any special apparatus for this purpose we extemporised a Woulfe's bottle of large dimensions, into one neck of which was inserted a long glass tube terminating in a "bell" at the upper end. The bottle, having had several strips of zinc placed in a vertical position inside, was made rather more than half full with diluted sulphuric acid, when a stream of hydrogen immediately rushed out. By carefully adjusting the emission of the gas a stream of great steadiness was obtained, and this, after passing through a drying-bottle, was conveyed to the burner, where it mixed with the oxygen and yielded an admirable light. From our experiment we felt satisfied that with two of these bottles—one to take the place of the other while it was being re-charged with fresh liquid—a supply of hydrogen could be obtained under such pressure and in such quantity as to serve the purpose of an exhibition of several hours' duration.

An improvement upon the Woulfe's bottle was afterwards secured in the adoption of a modified form of Döbereiner's lamp. This piece of apparatus, in its ordinary form, consists of a glass jar with a flat metallic cover, into which is cemented the neck of a flask without a bottom. When the jar is covered the flask reaches nearly down to its bottom; the upper end of the flask terminates in a stopcock, attached to which is a fine jet, and by means of a wire a piece of zinc is suspended inside the flask. When the outer vessel is nearly filled with diluted sulphuric acid, and the stopcock opened, the air in the flask is driven out, permitting the diluted acid to come in contact with the zinc, by which is caused an evolution of hydrogen filling the upper portion of the flask, in which it remains under pressure. This pressure, acting upon the surface of the liquid, forces it down beyond the zinc, upon which it has no further action until, by opening the tap and allowing the hydrogen to escape, the acidulated liquid is again enabled to rise in the flask and exercise its solvent action on the zinc, a continuous supply of hydrogen being thus obtained.

But the form of hydrogen generator which we found best was one we had made of wood lined inside with thin sheet lead, and which was on the same principle as the Döbereiner's lamp, although different in form. It consists of a square and oblong wooden box of the form and dimensions of a microscope case, for which it has more than once been mistaken. It is divided into two compartments by a partition from top to bottom; but, while this partition is soldered to the top and to each side, it does not come quite to the bottom, being distant from it to the extent of nearly a quarter of an inch. At one side of this box or vessel there is provided the means for throwing in scraps of zinc, and at the other a leaden pipe dips down through the top, almost reaching to the bottom. In the former division there is provided at the top the means for attaching a pipe to convey away the gas.

When diluted acid is poured into the vessel, hydrogen is liberated in great abundance in that division containing the zinc, and unless allowed to escape by the tap it exercises such pressure upon the liquid in that chamber as to drive it all into the other half of the vessel—a transition easily effected, as the lower edge of the partition does not quite touch the bottom.

By the length of the tube, or by the compression of the air in the other chamber, the pressure under which the hydrogen is to be emitted can be regulated with ease. Provision is also made to add either zinc or acid without interfering with the steady generating of the gas. It will be found advantageous not to place the partition in a vertical, but rather in a slanting, position. Gutta-percha or vulcanite will answer quite well as material of which to construct the generator, although thin sheet lead, backed by wood, will prove more durable, as the diluted acid has no action upon this metal.

One caution we must here append: do not collect the hydrogen for use until all the air has been expelled from the upper part of the generator, a mixture of atmospheric air and hydrogen being explosive.

EDINBURGH PHOTOGRAPHIC SOCIETY'S EXHIBITION.

[First Notice.]

Our readers will probably remember that, just twelve months ago, a paper, entitled *Exhibitions a Stimulus to Advance True Progress in Art-Photography*, was read before the Edinburgh Photographic Society by Mr. Asher. The outcome of that paper was a resolution to hold an exhibition towards the close of the present year, under the auspices of the above Society, although not directly connected with it, except in so far that the Exhibition Committee consisted mainly of the Society's Council.

During the preliminary meetings the ideal exhibition of the committee was of a somewhat limited character, and, as nothing of the kind had been held in Edinburgh for ten years, most of the members were new to the work, and at first it proceeded very slowly. When, however, the Lords of Her Majesty's Treasury, with most praiseworthy liberality, intimated their intention of granting the use of the Royal Scottish Academy National Galleries for the purpose, the ideas of the committee became enlarged, a fresh impetus was given to the work, and a determination was formed to leave no stone unturned to make the exhibition truly worthy of the northern capital and of the noble suite of rooms thus placed at their disposal.

With that end in view a very large number of circulars were forwarded to nearly all parts of the world, and the co-operation of most of the foreign photographic societies was solicited. The result has been a response, both as regards quantity and quality, very much in excess of the most sanguine expectations of the committee.

The Royal Scottish Academy National Galleries consist of a suite of five rooms, octagonal in form, and from the entrance giving an open vista of nearly a hundred feet in length. As they were

constructed expressly for the exhibition of pictures, the photographs with which the walls are completely covered—to such a height, at least, as they can be properly seen—are exhibited under the most favourable circumstances. In addition to the wall space tables have been erected in three of the rooms. These are covered with apparatus, chemicals, and photographic appliances generally.

Some idea of the magnitude of the Exhibition may be formed from the fact that the catalogue numbers reach 1135, and that the actual exhibits, exclusive of *cartes de visite,* number considerably over three thousand, contributed by precisely two hundred exhibitors.

The opening, which occurred on the evening of Wednesday, the 20th instant, took the form of a private view, to which some six hundred ladies and gentlemen were invited; and, in spite of exceedingly inclement weather, a large number attended. The Lord Provost, Sir James Falshaw, in declaring the Exhibition opened, congratulated the committee on the success which had attended their efforts, and assured those present that such a fine collection of photographic pictures had never before been brought together in Great Britian—an opinion which was endorsed by many visitors present who had seen nearly all the collections made not only at home, but also abroad, including that recently closed at Philadelphia.

The show of apparatus is both large and good, and includes examples of the best work of Mr. George Hare, Mr. P. Meagher, M. Jonte, of Paris, &c., &c.

Messrs. Mawson and Swan, of Newcastle-on-Tyne, show a camera as an example of cheapness combined with thorough efficiency, and several retouching-desks possessing the same desirable qualities. They also exhibit a very complete set of specimens of nearly all the chemicals used in photography, and some useful studio furniture.

Messrs. George Mason and Co., of Glasgow, are large exhibitors of cameras, stands, burnishers (including a new French specimen), musical and other chairs, head-rests, grass mats, a new studio lantern for enlarging, sketching, &c., some beautiful specimens of photographic chemicals, and, in fact, almost everything a photographer can require.

Mr. L. Warnerke has fitted up a table for himself, and shows specimens of his tissue in all the various stages up to the developed negative, and a series of illustrations of its application to double printing. He also exhibits a number of negatives side by side with transparencies printed from them, and an ingenious camera, by Jonte, of Paris, in which slides are discarded and the plates brought up from a receptacle below, somewhat after the mode devised by Mr. Aird, and published in our columns two years ago.

Mr. George Hare shows a number of exquisitely-finished cameras and changing-boxes; and Mr. P. Meagher sends one camera finished in the style with which his name has so long been associated.

Messrs. Kemp and Co., of Edinburgh, also exhibit a very complete series of specimens of photographic chemicals neatly put up, and which attract particular attention, several substantially-made cameras, stereoscopes, a set of carved oak miniature furniture, &c., &c.

Professor Piazzi Smyth shows the original camera with which his celebrated Pyramid pictures were taken, an ingenious cloud camera fitted with his plano-concave corrector, and several specimens of its work.

Messrs. Ross and Pringle have sent a complete set of daguerreotype apparatus and some fine examples of that beautiful process.

A table in the centre of the great room is covered with a number of illustrated volumes beautifully got up, and which seem a source of great attraction. They include two volumes of the portraits by D. O. Hill and Adamson, *English Celebrities, Disruption Worthies,* the works of Sir George Harvey and of Horatio Macculloch, and *The Scottish Bar, Works of Sir Henry Raeburn,* and selections from *Men of Mark.*

In addition to the exhibits enumerated, the tables contain a large number of pictures; but these and the works on the walls must be reserved for future notices. Meanwhile we give in another page a notice of the Exhibition taken from the columns of the *Edinburgh Scotsman.*

At the last meeting of the Physical Society, Mr. W. Crookes, F.R.S. gave an account of the principles and construction of the now well-known forms of the radiometer, with many experimental illustrations. He produced new forms of the instrument, and by screens and solutions of different substances, cut off or modified the effects of the rays associated with light. At the conclusion Mr. Crookes somewhat fully announced his hopes that new photometers might be soon given for scientific observations. He then described the general arrangement. Taking—first, the present radiometer as a type, to be influenced by the general action of light; secondly, another radiometer, leaving the rays of light passed through solutions and screens (say) of alum or rock salt, &c., to sift out or stop the rays of heat; and thirdly, a radiometer to allow the chemical rays only to pass. These radiometers are to be so constructed that their motions and forces may be registered by photometric processes. Constructed thus the instrument would be one always exposed, always recording, and might be placed anywhere in the world, requiring no attention, save putting the reflective, mechanical, and clockwork machinery in proper motion. Such is a brief outline of the means and the form of an instrument that, however delicate to arrange, seems fairly to warrant the hope that science may have in constant use an apparatus which seems capable of fulfilling the yet unsatisfied desires of photography and science. It seems a pleasant hope that photography may be the means of presenting the records of the hourly and daily changes of our luminous atmosphere from stations in all parts of the world almost inaccessible, and perhaps only to be visited at distant periods to take the records of the past, and to put in action the means for future observations.

It is generally considered that a batch of plates prepared under similar conditions as to process and preservative will produce uniform results provided the exposures given be proportionate to the nature of the subject, and in the abstract doubtless this will be found the case. But an element of uncertainty exists which is almost invariably overlooked—or perhaps the effect is attributed rather to a wrong cause—in the temperature of the atmosphere and of the solutions employed during development. The subject has been brought prominently before us by the recent suggestion of Lieutenant Lysaght to use "hot" development in connection with gelatine plates, one of the principal advantages of which is said to be a decrease in the exposure necessary. It must be obvious that no variation of the conditions of development can possibly produce a picture unless the latent image be previously impressed upon the sensitive film, and, though it is possible with a hot solution to successfully develope a picture with a given exposure when a cold solution fails, the difference which exists is not due to any variation in the sensibility of the plate, but to the increased reducing power of the developer. It has been proved long ago that temperature, *per se*, has no effect whatever upon the rapidity of a dry plate, though it is well known to exercise an important part in chemical reactions; hence the necessity for a considerable increase of exposure in cold weather when the solutions used in development are of the *normal temperature of the atmosphere.* A slight raising of the temperature of the solutions, then, may be of great use under certain conditions, but the power thus conferred should not be abused; any increase above a certain point brings with it a new series of troubles, and anyone who has experienced the difficulties which are encountered even in our own comparatively cool summers does not need to be told what those troubles are. We have, since the publication of Lieutenant Lysaght's communication, made several experiments in this direction, both with collodion and gelatine films, and find that with the exercise of care and judgment, a *warm* developer is a great assistance even in such weather as we have experienced during the last week or ten days. The temperature, however, should not be raised higher than from 90° to 115° (a tolerably wide margin be it remarked) or the development commences to be unmanageable. In using alkaline development the volatile nature of the ammonia in warm solutions is apt to prove troublesome; M. Davanne's developer of saccharate of lime proves an efficient substitute, though, especially when the temperature is raised, it assumes a deep discolouration almost immediately the pyro. and alkali come together, which is not, however, objectionable.

ON PHOTOGRAPHIC OPERATIONS IN THE RECENT ARCTIC EXPEDITION.

[A communication to the Photographic Society of Great Britain.]

On the return of the Arctic expedition I wrote to Sir George Nares suggesting that a report of the photographic operations undertaken by his staff would be very useful as a guide to the equipment of other similar expeditions. I was personally much interested in the success of the photography, as to me was entrusted the fitting out of both ships with the needful supply of apparatus and chemicals, and also two officers and two men (amongst whom, I believe, was Gunner Porter, who succumbed to the climatic influences) were sent down to Chatham to be instructed. Having had the benefit of Lieutenant Chermside's experience, I had impressed on these photographers the importance of being able to manipulate dry plates, and Paymaster Mitchell and Mr. White will be seen from the context to have profited by that advice. At the same time the practicability of working wet plates must be admitted as beyond dispute, and for this process ample means were provided.

When Captain Nares wrote to me before the expedition started he told me that the whole outfit must be as small as possible, as there was literally but small space in which to stow it. This being the case, $6\frac{1}{2} \times 8\frac{1}{2}$ plates were selected as the size of negative, and the whole equipment was arranged accordingly. One feature of it I wish to bring under notice, namely, hot-water tins in which to immerse the silver nitrate bath. The North American Boundary Commission, which consisted principally of Royal Engineers, took a large photographic equipment with them, and amongst it these hot-water tins. The report on the subject of the utility of these is most satisfactory from the last party (who had to endure a greater degree of cold in Canada than did the Arctic expedition), and, I believe, it will be found that the Arctic expedition will recognise the same as having these most useful adjuncts. Mr. H. Baden Pritchard gave every help to the expedition as far as photography was concerned, and it is a matter of the greatest satisfaction to himself and myself that results obtained in it have been so full of promise.

Thinking that a preliminary notice of the methods employed might be interesting to the meeting tonight, I wrote to Mr. Mitchell to ask him to give me any details he might see fit pending the official report. In reply this gallant officer wrote me a letter from which I have taken the liberty to make copious extracts, thinking that the words of the photographer himself would be much more expressive than any I could say for hin.

I am sorry Mr. Mitchell and Mr. White are not here tonight, but a meeting of the Geographical Society has, unfortunately, prevented their attendance. I had also hoped to get a few photographs to exhibit, but owing to these not as yet being published I was unable to obtain them.

I cannot do better than quote extracts from Mr. Mitchell's letter to me, to show you what were the conditions under which he worked. He says:—

"During the passage from Disco to winter quarters I did not lose an opportunity of making photographs night or day. Many were taken about midnight. The only place I had to work in was my cabin, which, as you must know, was not very large, and consequently not convenient. The water supply was necessarily small, and not by any means good. Printing was consequently not attempted.

"I used the wet plates and the formulæ as at Chatham in preference to dry plates. * * * I was much troubled with pinholes in the wet-plate negatives; dust, also, was a constant source of annoyance. I seldom had more chances than one, so that the first photograph was, as a rule, the final one.

"Although the temperature during the navigable season was low (a few degrees below freezing point) the exposures were very short—seldom over thirty seconds even at midnight in the month of August, and often only five seconds.

"The difficulty in the exposure was to give sufficient time for dark objects to come out. The ice and snow reflected so much light that two or three seconds would suffice for them, whereas for the ship or the dark reddish background of hills and land a much longer exposure, twenty or thirty seconds, was needed. If the exposure were prolonged the ice invariably came out with absence of all detail, and the resulting negative was useless."

This experience of Mr. Mitchell's, of course, coincides with that of all workers in cold climates, where ice and snow abound, and Arctic photography, on that account, must always be a difficulty. Mr. Mitchell then proceeds:—

"The winter came on quickly, and the photography ceased from want of light. Towards the spring dry plates were prepared with Liverpool emulsion and your albumen-beer plates. I worked very hard with the emulsion plates, and found them very quick indeed—five seconds in bright sunshine in the coldest weather—but I did not consider them satisfactory, as I thought them weak. The near and dark objects came out the best.

"I used the albumen-beer plates when I wanted to make certain, and found them generally to answer very fairly; they, too, were weak, but I attribute that to the great strength of the albumen-beer used in their preparation. When going up to the 'Alert' I took the camera and three albumen-beer plates with me. They all came out, and are preserved—fifteen seconds' exposure with temperature between — 20° and — 30°.

"A very passable negative was made with an albumen-beer plate a week before the sun rose; the lens faced the south at noon, and with thirty minutes' exposure a negative of the ship and skating rink, &c., was taken; the temperature at that time was — 46° (or 78° below freezing point). The ship was photographed on the 6th of March, a week after the sun rose, with an albumen-beer plate; temperature — 64° (or 96° below freezing point), exposure half an hour, and a bright sun shining. It was under-exposed, but not sufficient to spoil it.

"In May I left the 'Alert' with an exploring party to the northward, taking with me a few plates prepared by Mr. White with the gum-gallic process, but they came out terribly spotted in the sky. They are, however, preserved.

"Mr. White was successful with dry plates with the tea preservative.

"One day, being in a hurry, I sensitised the plates, and after washing them well put them in a slide, carried them six miles, and photographed the coal seam at Discovery Bay. On my return to the ship I dipped them in the bath and developed as usual for wet plates. One came out very fairly, considering that they only took their chance of drying in the slide during the walk.

"My great difficulty was with the water; in the early spring nearly all I used I was obliged to obtain from melted snow, and even that used to contain some chlorides, even when obtained some short distance from the sea.

"Taking all our difficulties into consideration," he concludes, "I think that on the whole we were fairly successful. Of course they would not pass muster if seen in England. I found no difficulty with wet plates at — 40° (or 70° below freezing point), provided I had not far to carry the plate from the ship, as the exposure was short and the slide could then be previously warmed and then well wrapped up."

With too much modesty he says—"I do not think I could write a paper on the subject, being a *very small amateur*, especially as I am not altogeter satisfied with my own productions."

I think, gentlemen, that we have learnt something from this outline, which is, that the wet man and the dry man can both succeed in the production of pictures in the most intense cold. We are most of us not likely to meet one difficulty Mr. Mitchell met with, namely, in being unable to photograph at midday owing to the absence of the sun below the horizon, though we may be called upon to take photographs at midnight in regions that are habitable. I should imagine that the photograph taken at 69° below freezing point is a curiosity, being probably the only one ever taken at such a low thermometric reading; and I am happy to think that the albumen-beer process did not fail under such trying circumstances.

I see allusion is made to the tea preservative. It has been a great favourite of mine, and I believe that pictures taken by it within twenty-four hours of preparation can be fairly compared with the best wet plates; but my experience is that they will not keep. It will be a matter of some curiosity for me to learn if these plates were exposed after long keeping, as, if so, it proves that cold is favourable for even the most unstable of dry-plate processes.

In a letter I had from Sir George Nares he tells me that he is making a report from nature of his expedition. This will consist of photographs taken from the untouched negatives, and signed by him as such. From what I can gather these will be printed in a permanent process, and will, therefore, be interesting relics of the expedition in time to come. Rich in scientific work as this expedition has been, and great as has been its success in every way, except in the absolute attainment of the pole, it has also taught us photographers a lesson—that a little tuition, and plenty of energy and brains, will allow mementoes of difficult and dangerous expeditions to be secured by means of the camera.

W. de W. Abney, *Capt.* R.E., F.R.S.

NEW EXPERIMENTS IN INTENSIFICATION WITH LEAD.*

The Resistance of Lead Pictures to Reagents.

An exact acquaintance with the behaviour of lead-intensified pictures with reagents is of general interest, and at the same time serves as a guide to further experiments with the method, as well as perhaps offering a key to many phenomena which obstruct the path of the practical photographer. In the following lines we describe the properties of the "lead picture," as studied by us. It shows itself very susceptible to reactions, which will admit of, or give rise to, the adjustment of many modifications and "new" processes.

* Continued from page 606

1. *Hyposulphite of soda* reduces the lead bath completely—so much so that the ferrocyanide of silver as well as the lead is dissolved; therefore it is used as a clearing medium.

2. *Cyanide of potassium* does not act as a weakener to any considerable extent; it only dissolves the silver. The ferrocyanide of lead is converted into cyanide of lead, which is insoluble in excess of cyanide of potassium and remains in the picture—of which, however, the latter forms the principal part, and on that account the weakening is not thorough. A lead picture so treated with cyanide of potassium consists of cyanide of lead, and exhibits the following properties:—Muriatic acid reduces it, and chloride of lead is formed; hyposulphite of soda does not act upon it, nor does iodide of potassium nor permanganate of potassium; chloride of iron colours it slightly brown, and chloride of lead is formed, which on being washed with water is wholly dissolved.

3. *Sulphide of ammonium* blackens the lead picture, and all other combinations of lead and silver, by the formation of metallic sulphides; it is upon this principle that our first method of intensification is based. The black picture is not changed by any of the reagents mentioned here.

4. *Chromate of potassium* leaves the ferrocyanide of silver unchanged, and with the ferrocyanide of lead only gives chrome yellow; the white picture also becomes yellow. Upon this our second method of intensifying is based. Such a chromide of lead negative contains also chromate of lead and ferrocyanide of silver. Hyposulphite of soda and *cyanide* of potassium make it a little thinner, without otherwise altering its appearance, the silver only being dissolved. Caustic potash and soda only reduce the chrome yellow; with chloride of iron it becomes a deep green, as the ferrocyanide of silver is changed into chloride of silver, and, at the same time, Berlin blue is formed, which, with the chrome yellow, gives green (the green colour is changed to brown by permanganate of potassium). A solution of chloride of copper acts in a similar way, by creating red ferrocyanide of copper and a mixture—nitrate of uranium and sal ammoniac—which gives the peculiar reddish-brown colour of Selle's intensifyer, ferrocyanide of uranium; also, in both these cases, it is only the ferrocyanide of silver, and not the chrome yellow, that enters into the process. A solution of iodide of potassium colours the clear, yellow, chrome lead plates a deep yolk-of-egg colour. It consists of iodide of silver and iodide of lead, the latter of which can be washed out with a great deal of water.

5. *Permanganate of potassium* quickly changes the white lead picture into a dark manganese brown. Such a manganic picture is not acted upon by chloride of iron. If the permanganic solution be strongly acidified with acetic acid, the negative will become much thinner than when a neutral solution is used.

6. *Iodide of potassium*, with the ferrocyanide of silver only, forms the corresponding iodide; but in a short time the ferrocyanide of lead is also converted into iodide of lead, and by this means the whole negative becomes perfectly yellow—a colour which exposure to light bleaches in time. Concentrated solutions of iodide of potassium colour the picture a whitish yellow and partially eat it away. When the iodide of potassium solution is washed off the latter becomes turbid, the film becomes a deep yellow, and, owing to the adhesion of the iodide of lead held in suspension, the negative becomes fogged. A concentrated solution of iodide of potassium forms with iodide of lead a very soluble, white, double salt, which can be decomposed by water back again into iodide of lead and iodide of potassium.*

Hyposulphite of soda dissolves the whole picture; sal ammoniac only dissolves the iodide of lead; ammoniac hydrate colours the picture, at the same time forming ammoniac iodide of lead (PCI_2, $2\ NH_3$), and dissolving the ferrocyanide of silver; alkaline carbonates and sulphates also make the pictures white; and permanganate of potassium browns it at once. Concentrated silver solutions change the iodide of lead into iodide of silver. (If a lead picture be treated first with iodide of potassium and then for several hours with a silver solution, washed, and reduced with an alkaline developer, the result is a picture consisting only of metallic silver. Upon the silver originally present, three times the quantity of metallic silver is superimposed, *a most striking example of a purely chemical silver intensification.* The accumulated silver molecules seem, however, to lie but loosely upon one another, and such a picture, if placed again in the lead bath, would no longer be able to retain a hold upon the thick deposit of ferrocyanide of lead.)

7. *Ferrous sulphate* with ferrocyanide of lead forms a lead picture consisting of sulphate of lead; at the same time the picture becomes bluish, and on exposure to air it quickly becomes dark blue, owing to the formation of Berlin blue. Permanganate of potassium soon converts the blue into brown.

* See Boullay, *Journal Pharm.*, 12, page 639, and Berthemot, *Journal Pharm.*, 13, page 412.

8. *Ferrous iodide and ferrous chloride* behave similarly to the foregoing, forming iodide of lead and silver, and, of course, the corresponding chloride.

9. *Ferric chloride* at once colours the white lead picture a deep blue by forming chloride of silver, chloride of lead, and Berlin blue. (The action of metallic chlorides upon pure ferrocyanide of silver, as obtained by treating a silver negative with red prussiate, is quite analogous. Chloride of silver and the ferrocyanide of the metal used are formed; thus with perchloride of iron the negative is coloured blue, with chloride of copper reddish-brown, &c.) Permanganate of potassium browns the picture.

10. *Solution of chloride of sodium* slowly converts the ferrocyanide of lead into soluble chloride of lead, so that a lead picture may be very much weakened by placing it in a solution of common salt in water; chloride of silver is also far from insoluble in chloride of sodium.*

11. *Chloride of copper* colours the lead picture a reddish-brown; whereupon the same process as in No. 9 sets in.

12. *Sulphate of copper* produces the same colouration as the foregoing preparation, yet the process by which it is produced is not the same; for while, in the case of the former, chloride of silver, chloride of lead, and ferrocyanide of copper are formed, here the ferrocyanide of silver remains intact and the ferrocyanide of lead only is decomposed by the sulphate of copper, and a mutual exchange takes place, leaving sulphate of lead and ferrocyanide of copper.

13. *A mixture of sulphate of uranium and sal ammoniac* colours the lead picture brownish-red (formation of ferrocyanide of uranium). Hyposulphite of soda draws out of all these plates only the chloride of silver and lead, and leaves behind the pure metallic ferrocyanide.

14. *Chloride of cobalt and sulphate of cobalt* give the lead picture a greenish hue, which gradually becomes a reddish-grey. *Chloride of nickel* and *sulphate of nickel* produce a greenish colouration.

15. *Perchloride of mercury* does not change the appearance of the white lead picture, but the density of a negative treated with it increases, and insoluble white ferrocyanide of mercury is formed.

16. *A solution of iodide of potassium saturated with mercuric iodide* (saturation produced by adding perchloride of mercury to a solution of iodide of potassium until the red deposit arising from this proceeding no longer dissolves) colours the lead picture a deep orange-yellow. Iodide of silver and iodide of lead are formed, and, at the same time, iodide of mercury is thrown down; and, apparently, the picture also contains ferrocyanide of mercury (this solution was formerly frequently used as an intensifier for silver negatives).† The picture becomes extremely dense, and, in consequence of the subsequent treatment with sulphide of ammonium, black and stable. This reaction might be considered a very useful method of intensification, were it not that the sulphide of silver imparts to the negative all those unpleasant properties which have been attributed to plates intensified with mercury alone.

17. *A mixture of sulphate of copper and bichromate of potassium* creates a reddish-brown colour, similar to that produced by treating a yellow chrome lead picture with chloride of copper; in the first reaction, however, less ferrocyanide of copper is formed than in the case of the latter, because in this the ferrocyanide is furnished by ferrocyanide of silver (from which chloride of silver is formed), in that it is furnished by ferrocyanide of lead (which is present in considerably greater quantity, and from which chromate of lead is formed). To illustrate the case we give an example:—

a. A lead picture is treated with chromate of potassium, and, now consisting of ferrocyanide of silver and chromate of lead, is coated, after being washed, with a solution of chloride of copper; it contains, finally, chloride of silver, chromate of lead, and a certain quantity of ferrocyanide of copper, which arises from the reaction of ferrocyanide of silver and chloride of copper.

b. A lead picture is coated with a mixture of bichromate of potassium and sulphate of copper; it then contains ferrocyanide of silver, chromate of lead, and three times the quantity of ferrocyanide of copper contained in *a*, arising from the reaction of sulphate of copper and ferrocyanide of lead.

c. Lastly: if the reddish-brown negative obtained by *b* be treated with a solution of chloride of copper the ferrocyanide of the silver is also converted, by the formation of chloride of silver, into ferrocyanide of copper, and the negative contains chloride of silver, chromate of lead, and four times the quantity of ferrocyanide of copper contained in *a*. First, there is ferrocyanide of lead + sulphate of copper: ferrocyanide of copper; then there is ferrocyanide of silver + chloride of copper, again giving ferrocyanide of copper.

* For more exact information as to the solubility of chloride of silver in solutions of metallic chlorides see A. Vogel, in *Chem. Centralblatt*, 1874, page 578.

† See S. Kleffel *Handb. d, Phot.*, vii aufl., page 145.

(The same result—namely, the formation of a great quantity of ferrocyanide of copper—may be more quickly obtained by treating a lead picture with a mixture of chromate of potassium and chloride of copper. If instead of the solution of chloride of copper, mentioned at the beginning of *c*, ferric chloride be used, the negative will contain chloride of silver, chromate of lead, ferrocyanide of copper, and Berlin blue. In this way negatives having a wonderful mixture of components can be produced in a purely chemical manner. It is easy to build up variations and complications upon the basis of the foregoing.)

From all these plates hyposulphite of soda only draws out the chloride of silver and chloride of lead, leaving behind the metallic ferrocyanides. All these apparently useless speculations throw a clear streak of light upon the possible modifications and their results, and the fertility of the ground upon which our method rests. So much for the theory; nor does practice employ any, since, by suitable combination and elimination of the metals in the picture in the way indicated, the enamel photographer can draw great profit from it.

18. *Concentrated silver solutions* (from 1:8 to 1:10) change the lead picture, slowly but completely, into ferrocyanide of silver, while the lead goes into the solution as nitrate of lead. The whole picture, consisting of ferrocyanide of silver, is converted by chloride of sodium into chloride of silver, and may then be reduced to the metallic state by an alkaline developer. Also in this way one may obtain by *chemical means a silver intensification*, which is slower than that formerly given, but brings about the same result.

Josef Maria Eder, M.D., and Victor Tóth, *Captain.*

(To be continued.)

A NEW AND SIMPLE METHOD OF WORKING IN THE FIELD.

[A communication to the Photographic Society of Great Britain.]

A very common and, in fact, the strongest argument advanced by the advocates of wet collodion in the field against the use of plates prepared at home is—"Oh, we like to see what we have got, and by using wet collodion we can ensure good results." In reply to this I might say any experienced dry-plate worker having plates, lens, &c., that he is accustomed to work with, and the conditions of light and subject being favourable, can, though lacking proof whilst out, be equally certain of producing good results when developing his negatives comfortably and leisurely at home in his dark room; however, it is not now my business to argue as to the merits of wet or dry collodion, but to describe a method by which, with ready-sensitised plates and very little more *impedimenta* than the dry-plate worker usually carries, the said plates may be developed on the spot. I use emulsion plates washed and flowed over with a mixture of glycerine, albumen, and water. The proportions will vary according to circumstances, thus:—

If the plates are meant to be exposed and developed within a short time the following will answer perfectly—

Glycerine	1 ounce.
Albumen	1 „
Water	20 ounces.

But if, on the other hand, the plates are required for long keeping I should increase the quantity of glycerine and decrease the water. I have brought some plates with me, for the purpose of developing them before you, which have been prepared three weeks and one week respectively. In a perfectly tight box I should not hesitate to keep them twelve months, or send them on a voyage to India, having every confidence that they would give good results when used. The preservative was—

Glycerine	2 ounces.
Albumen	1 ounce.
Water	6 ounces.

As for the emulsion to be used any good sample will do; that is to say, what will do for dry plates will answer equally well for moist. Nor is it material whether the emulsion be such as has been washed, dried, and redissolved, or that which contains soluble salts, inasmuch as washing is required in both cases. A hint here on the subject of washing will not be out of place, and may be useful to some. I frequently see it recommended to wash under a tap or from a jug. Well, one pint of water in a dish or bath will more effectually do the preliminary washing than twenty pints from a tap, and for this reason:—If placed in a dish, the ether and alcohol become absorbed by and diffused through the water. More than that, the alcohol, having so great an affinity for water, will absorb some into the film itself, and thus prepare it for a final wash under a tap; whereas, if the plate, so soon as the film has set, be placed under a stream of water, the water will be repelled almost as fast as it is poured on, and for some time it would appear to be of as much use to attempt to wash a piece of tallow. By the way, I prefer to use distilled water for the first wash and final rinse before applying the preservative, which latter I do by taking the plate on a pneumatic holder and flowing a little over the surface from any suitable vessel; a very little suffices. Let the excess go into the sink, then stand the plate up to drain, face inwards, each successive plate resting against the back of the previous one. When all are done store them away in a suitable box till wanted. I have with me a box which I use for the purpose of containing the plates I shall develope this evening, and also the unfixed negatives, all of which were exposed on Saturday last. I had waited all week for a chance of doing so, and as I had many experiments to make I cut down the exposure, as my only object was to demonstrate my method without desiring to have fully-exposed negatives. This I need scarcely ask you, experienced photographers, to make due allowance for. I have plates of two degrees of sensitiveness. Of the more sensitive kind I have only one, as I fear with the light I shall have to work here there will be probability of fog. The sensitiveness I have tested to be twice to three times greater than that of a wet plate with bath and chemicals in fair working order; hence great care is necessary in the manipulations. I develope thus:—Flush the surface with—

Saturated solution of carbonate of ammonia	1 part,
Water	1 „

and return to the bottle; then, having poured sufficient of an eight-grain solution of pyro. into a developing cup, I complete the development with the same, using if necessary a few drops of a ten-grain solution of bromide of potassium added to it as a restrainer. When details are well out I flood the plate with water acidulated with acetic acid just so much that its presence may be detected by the smell. This wash effectually neutralises the ammonia and stops the action of the developer. The negative may now be stowed away until it be convenient to fix and complete.

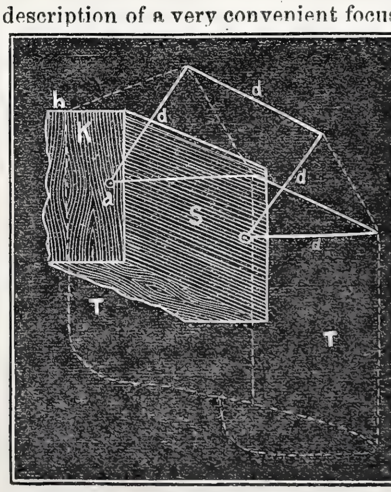
I like to finish off with acid pyro. to which a drop or two of a twenty-grain solution of nitrate of silver has been added. This, however, may be done at any time, if correctly or under-exposed, *before* fixing; if over-exposed, *after* fixing. In any case, before applying the acid pyro. and silver I flood the surface with the acidulated water before mentioned. I need scarcely say that the novelty and simplicity claimed in the title of this description does not include the preparation of moist plates; it is probable such had been made before my advent in photography. What I claim is a new and simple method of developing in the field without water. Half-a-pint of solutions will suffice to develope a dozen plates of the size I use—8×5. I place before you on the table one two-ounce and two six-ounce bottles, all that are required for the purpose. As for the tent, that known as Howard's, or a Stillman's changing and developing box, would probably answer as well as any, and their weight would be a mere trifle.

Peter Mawdsley.

FOREIGN NOTES AND NEWS.

A Convenient Focussing-Cloth.—An Improved Drying-Box.

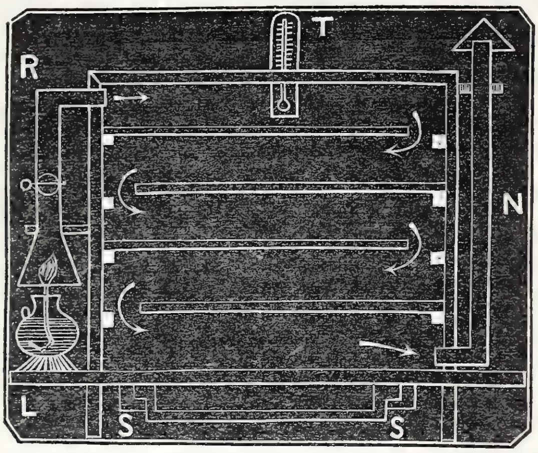
The last number of the *Mittheilungen* contains an illustrated description of a very convenient focussing-cloth used by Herr Kurtz,



It is constructed as follows:—Two strong wires are bent into the shape of D D, D D in the accompanying figure, and the eyelets at their ends are fastened by means of small, half-screwed-in screws to the back of the camera K at A, so that from A they may be folded back like the hood of a carriage. While still spread out a piece of black cloth or satin, T, is thrown over them, and fastened at H to the camera K with a couple of tacks, and at the corners of D D, D D with a few stitches. The whole is arranged so that it can be raised or lowered like a carriage hood by a single movement of the hand, and saves the annoyance of pulling off and on the cloth.

The necessity of having, and the difficulty of obtaining, perfectly dry films for lichtdruck, enamel, and carbon prints have resulted in

the pretty general adoption of the drying-box. The commonest form is a box heated from below by a gas or spirit lamp, and having a chimney at the top by which the heated air escapes. This plan is, however, liable to a number of objections, such as that the box heats but slowly, that a great expenditure of heat is required in order to dry a quantity of plates or papers thoroughly, and that when the plates are placed upright they dry first at the upper and under edges, leaving the most important part, viz., the middle, to dry last. These objections Herr Th. Honikel has endeavoured to overcome by causing the heated air to pass downwards and equally over each plate so that the middle shall dry as soon as the edges. He describes his method in the *Archiv*, and its explanation is materially assisted by the accompanying illustration of a section of the box.



R. Heating tube. L. Lamp. T. Thermometer. S S. Drawer.

A roomy drying-box, large enough to contain any size of plate or paper, has a bent sheet-iron tube R, terminating in a funnel-shaped mouth let into one of its sides just under the lid; and at the opposite side, near the ground, a suction tube is furnished, which is continued a little further than the top of the box. A lamp L is then placed under the reversed end of the tube R, and the heat ascends by the latter into the top of the box and is sucked downwards, in the direction indicated by the arrows, by the escape-tube N. The box is closed by a well-fitting door fastened by a key, and the interior is fitted up so that it can be used for all purposes, though in the illustration the cross-bars upon which the plates are laid are omitted in order to show more distinctly how the stream of air winds backwards and forwards. Plates are laid flat upon cross-bars, and when they must be absolutely horizontal they are levelled, as usual, by adjusting-screws. Paper which is hung up to dry may be suspended from catches attached to the lid. Dry plates are placed as they are prepared upon a negative holder, which is placed in the box with them. The grooves of these holders are, however, not of the common form, but are like WWWW, because the corners of the former retain some moisture. It is not advisable to open the door before the plates are perfectly dry; but a drawer S is placed at the bottom of the box, by means of which fresh blotting-paper may be introduced, and in which a test-film may be laid, by whose appearance one can decide as to the regulation of the heat and whether the circulation is all right, supposing it were not perfect at the commencement. Above the centre of the drawer the floor of the box has a hole cut in it. In almost every case the thermometer T, the bulb of which is within the box and the scale without, will be found useful.

A FEW ODDS AND ENDS.

[A communication to the Glasgow Photographic Association.]

When asked by our Secretary some time ago to write a paper for the Association I was quite at a loss to know what to write about, my experience in photographic matters being so limited. Someone suggested that I should write about my failures. A paper on that subject would certainly have the advantage of length, but I question whether any good would result from it, as most, if not all, our members are supposed to have passed that stage of photography where failures are the rule and successes the exception. After searching in vain for a subject I have come to the conclusion just to give one or two short notes on matters which have from time to time interested me; and if I can succeed in starting a discussion on any of the subjects my aim will have been attained. I may tell you at once that I have nothing new to communicate, my intention being merely to bring before your notice one or two things that have been perhaps passed by unnoticed, and which when fairly tried have proved of some practical use.

I think I have tried most of the formulæ for iron developer that have been published, and have found them all more or less satisfactory; but, until the publication of the formula for the collo-developer by Mr. M. Carey Lea, I never discarded the ordinary fifteen-grain solution of protosulphate of iron and acetic acid for regular use. When Mr. Lea's formula appeared in the Journal I was quite surprised at the small amount of collocine that was required to produce the necessary restraining action, and I immediately set to work to prepare some of the agent to experiment with. His instructions are to take—

Gelatine	6 ounces.
Water	9 fluid ounces.
Sulphuric acid	6 ,, drachms.

When the gelatine has dissolved dilute to twelve ounces, place in a flask, and boil for two hours. Then add one ounce of granulated zinc, and boil an hour and a-half longer.

It is rather a tedious process, especially for those not accustomed to chemical manipulation; but, as I believe the substance can be bought, at a small cost, ready prepared, it is on the whole more convenient to purchase it. I have brought a small bottle of a sample I prepared in March last, and since then I have used the collo-developer almost exclusively.

One drop of the collocine added to three ounces of a fifteen- or twenty-grain solution of protosulphate of iron, with a small quantity, if required, of methylated alcohol, makes a developer which, as far as I can judge, is at least equal to the ordinary aceto-iron developer. Now, taking the collo-developer as being quite equal to the ordinary acetic acid mixture, look what an immense saving of acetic acid there is, or, rather, what an immense saving results from the substitution of collocine for acetic acid. One ounce of collocine is sufficient for 1,500 ounces of developer, whereas one ounce of acetic acid will only make thirty ounces. The strength of the collocine should be ascertained before using, as different samples will vary. Make up a solution of protosulphate of iron of the strength of thirty grains per ounce, and divide it into three portions. To the first add one drop of collocine to every three ounces of solution; to the second one drop to two ounces; and to the third one drop to one ounce. Prepare three plates and expose each for the same time upon the same subject, develope them respectively with the three developers, and note which gives the most satisfactory result. You will thus determine the requisite amount of collocine to add to your developer.

During the dull weather that we are now being favoured with printing is a very slow operation, and the advantage of sensitive paper that will keep for some time without discolouring is evident. For instance: on a bright morning that suggests a fine day the photographer may sensitise a large amount of paper, and by the time it is dry the day may so have changed as to render printing almost an impossibility. Still he has all this paper on his hands, and as it will only keep for a day or two at the most there must necessarily be a considerable loss. There have been a great number of formulæ given for the preservation of sensitive paper, many of them necessitating additions of various chemicals to the silver bath, and subsequent fuming of the paper with ammonia. I have not tried any of these processes, as I did not want to run the risk of spoiling my silver solution by adding foreign substances thereto, but rather looked for a process that would not necessitate any alteration of the usual bath, and would be otherwise simple.

The process I have now adopted and used regularly for upwards of a year was published first, I think, in the photographic almanacs a year or two ago. Sheets of blotting-paper are steeped in a solution of bicarbonate of soda and dried. The strength of the solution is not of importance; I use an almost saturated one, but I believe a weaker one would answer. The silver bath should be made neutral by the addition of bicarbonate of soda until there is a permanent precipitate, and allowing this precipitate always to remain in the bottle in which the solution is kept. Float the paper for the usual time—perhaps a little longer—and then absorb the superfluous silver solution by placing the paper between folds of blotting-paper. When almost, but not quite, dry the sensitive paper is interleaved with the already prepared blotting-paper, and the whole put under a slight pressure. Paper prepared in this way will retain its whiteness for, at the very least, a month, and probably longer; thus a large stock can be made at any time, to last for weeks, which is always at hand ready for use. If an insufficient number of prints be produced in a day to be worth toning, they can be kept until the following day by replacing them between the sheets of blotting-paper. This process is particularly useful for amateurs, who can print one day and leave the toning and fixing until they have another opportunity.

I now come to a branch of photography for which I have for a long time had a great liking, although I cannot say that I have met with much success in it until lately. I refer to the dry-plate process. Nobody will for a moment deny that good, reliable, rapid dry plates are things which, if they could be procured or prepared with absolute certainty, would be of the utmost use to the professional as well as to the amateur photographer. Professional photographers seem to think that it is absolutely necessary to see their results on the spot. To arrive at this end the wet process becomes almost a necessity, and with it the usual amount of *impedimenta*—tent, chemicals, tripods, &c.—the carrying of which from place to place on a hot summer's day is enough in itself to take all the artistic feeling out of the unhappy photographer. I speak, I may say, from experience. Now if a dry process could be

discovered that would be as certain and give as good results as the wet process all this bother would be done away with, and the photographer could start on his day's journey with a light heart and a light handful of apparatus.

I have tried at various times the albumen, hot water, beer and albumen, coffee, tannin, &c., processes, and have had both failures and successful results with almost all of them; and latterly I have been turning my attention to the emulsion processes, as I think it is in that direction we must look for the process of the future. Now, although I have not met with very great encouragement in the various bath processes I have tried, I do not mean to say that good results cannot be got by that means; for there is no doubt that excellent results can be got by all the processes that have from time to time been published if only a fair trial and some amount of perseverance be given to them.

The great charm of the emulsion process is its simplicity, and the particular process I am now going to describe is, I think, the simplest I have come across. I may say it is only lately that I have taken up the process, so have not yet given it a thorough trial; still, the results of my experiments, as far as I have gone, may be of interest to you, and at some future meeting I hope to give you the results of my further experiments. The process I refer to was first published in October, 1875, by the Rev. Canon Beechey, and was said by him to be a simplification of Colonel Stuart Wortley's process. Make a stock solution as follows:—

Absolute alcohol	8 ounces.
Bromide of cadmium (dried)	300 grains.

Let stand until clear, decant, and add—

Hydrochloric acid	1 drachm.

Label this "bromide solution."

To prepare the emulsion, take:—

Dried and powdered nitrate of silver	40 grains.
Alcohol (·820)	1 ounce.

Put in a small flask and apply a gentle heat, taking care not to let the flame come near the mouth of the flask, as the alcoholic vapours would ignite. When all the silver is dissolved, which will take a few minutes, prepare some bromised collodion as follows:—

Bromide solution	½ ounce.
Absolute ether	1 ,,
Gun-cotton	12 grains.

Put this in a bottle and dissolve by shaking. When dissolved, take your hot solution of silver and add it to the collodion all at once, cork the bottle and agitate for some time; then lay aside for twenty-four hours, giving the bottle a shake at intervals. A great deal has been said about getting a suitable sample of gun-cotton for dry plates; that which I have used is some I got from London, and is sold as "dry-plate gun-cotton." It is very powdery and gives a porous film—a most desirable quality for emulsions. After an interval of twenty-four hours the emulsion should again be shaken and filtered throught cotton wool loosely plugged into the neck of a funnel, when it will be ready for coating the plates. The plates should receive a substratum; each person will probably have his own method of performing this operation. I prefer to use gelatine, as it has all the good qualities of albumen and none of its bad ones. The strength of the solution should be about one grain per ounce, and it should be filtered before use. I have often seen it recommended, when a weak solution of albumen was used, to pour it over the clean and polished plate while dry, and it is said to flow over like collodion provided the solution has been kept long enough and has had sufficient ammonia added. This looks very nice in print, but, as far as my experience has gone, although I have kept the solution for a year and added ammonia liberally, I have never been able to get a medium-sized plate covered in that way; do what you will the pool of albumen will branch off in various directions and you lose control over it altogether. My *modus operandi* is to well wet the plate with a rag charged with hydrochloric acid, wash under the tap, and set up to drain while another one is being subjected to the acid treatment; then flow over the gelatine twice, and put in a rack to dry.

With your prepared plates before you, you take the bottle of emulsion and coat as many as you can conveniently put in a tray of clean water, which should previously have been got ready. They must remain in here until all greasiness disappears, and are then ready to be put in the preservative solution, which should also be in a large tray. The preservative is—

Beer	10 ounces.
Pyrogallic acid	10 grains.

Let the plates remain in this for about ten minutes, and then, after draining for a short time, put them in your drying-box to dry. Any light-tight box will do for the purpose; and by passing a hot-water tin in along with the plates they will be dry all the sooner, and be all the better for it. With regard to the exposure required by these plates I cannot yet say anything definite; they are not particularly rapid, reliability being rather the quality aimed at.

For developing these plates the alkaline pyrogallic method is resorted to. I have used only Colonel Wortley's strong alkaline developer, and believe it as convenient as, and gives better results than, any other form. There are three different solutions required, viz.:—

A.

Pyrogallic acid	96 grains.
Alcohol	1 ounce.

B.

Bromide of potassium	12 grains.
Water	1 ounce.

C.

Carbonate of ammonia	60 grains.
Water	1 ounce.

Before applying the developer well wash the plate with water, and drain a moment. Then take of—

A	30 drops,
B	60 ,,
C	2 drachms,

and pour this over your plate once or twice, and your picture will soon begin to appear. If it flash out all at once it is over-exposed, and must be immediately washed and the development begun again, adding this time more of B. If the plate appear under-exposed add another dose of C to the developer. If you always keep in your mind that ammonia hastens the development and bromide retards it you will soon get quite as much at home with the alkaline developer as you are with the ordinary wet-plate developer. These plates give remarkably fine-toned transparencies, as you will see from some of the specimens. I noticed that those plates which required the greatest amount of ammonia adding to the developer were of the richest colour; while those that required a considerable amount of bromide were somewhat of a greenish colour—by no means so warm-toned as the others. In other words, plates that had been exposed for the correct time under the negatives gave warmer-toned transparencies than did those which had been over-exposed, and consequently required a greater amount of bromide in the developer to prevent fogging.

You will see that instead of backing the transparencies with ground glass, as is the usual custom, I have adopted another plan. These plates, which are in imitation of opal glass, are prepared by adding to one ounce of plain collodion two drachms of ordinary negative varnish, and coating clean glass plates, while *cold*, with the mixture, and letting them dry without the aid of heat, or, at least, without applying any strong heat. I first saw this mixture recommended by the Editor of THE BRITISH JOURNAL PHOTOGRAPHIC ALMANAC, and he recommends it as a substitute for ground glass in the making of stereoscopic transparencies.

I have here a plate-holder which may be new to some of you. I got the idea from a photographer who pitched his tent near mine when I was at work amongst some of the finest scenery in Scotland, and I thought the holder so simple and convenient that I have used similar ones ever since, and shall continue to do so until something better turns up. You will observe that a separate holder is required for each size of plate; for large sizes the wooden handle may be dispensed with. With regard to the making of them, a single glance will give you all the information required.

EDWIN SMITHELLS.

EDINBURGH PHOTOGRAPHIC EXHIBITION.

LAST night there was opened in the galleries of the Royal Scottish Academy an extensive and interesting collection of photographs, which has been brought together under the auspices of the Edinburgh Photographic Society. The idea of having such an exhibition was mooted in the council of the society a good many months ago; and the project being cordially taken up by members and others a handsome guarantee fund was speedily subscribed. Steps were then taken to enlist the co-operation of photographers in all parts of the world, and the result is now before the public in an assemblage of pictures completely occupying the Academy's rooms, and in which nearly every civilised country is more or less adequately represented. Some ten years have elapsed since a similar exhibition was held by the Photographic Society of Scotland. Every one knows in a general way that in the interval the art in question has made great progress; but the extent and varied chrracter of that progress can only be fully realised by those who can compare impressions of the former collection with that now inviting attention. There is, we believe, no photographic process which does not here find illustration; and those who take interest in the development of the art may trace its gradual stages in a series of typical specimens.

Of the English contributors, R. Faulkner and Co. have furnished one of the gems of the exhibition in three carbon-printed vignettes of half-nude children, enlarged from very small negatives. For piquancy, combined with natural breadth of expression and softness, without insipidity, of tone, it were hard to conceive anything finer. H. P. Robinson, Tunbridge Wells, sends, among other fine work, several composition groups remarkable for felicity of arrangement and accuracy of detail. Of landscapes from his hand we noted one example in particular, in which, apparently by printing from two negatives, great sharpness in the definition of hill and woodland is conjoined with equal precision in the rendering of a beautiful mottled sky. From W. Nicolson, Isle of Wight, come two or three woodland subjects, notable for brilliancy of lighting over well-defined foliage; and from Vernon Heath, London, several enlarged landscapes, in which the gradation of tone through a long reach of distance is very successfuly managed. Several effective studies of broad sunshine from skies flecked with clouds and over seas gently rippling, or breaking on the shore in curling waves, are contributed by Colonel Stuart Wortley. To Mrs. Cameron, Isle of Wight, the exhibition is indebted for a set of designs dealing with such subjects as *The Foolish Virgins*, *Prospero and*

Miranda, and *Lancelot and Guinevere*, composed with true artistic taste, and photographed with a certain Rembrandtesque effectiveness of light and shade. A frame sent by Payne Jennings, Dublin, embraces a series of picturesque landscape bits from England and Wales, in which one is at a loss whether to admire most the felicity of composition, the delicate sharpness of detail carried far into the middle distance, or the charmingly-soft tone pervading the work. George Nesbitt, Bournemouth, sends with a number of cleverly-manipulated composition groups a study entitled *Morning*, where an infant just awoke tumbles on his bed with a merry expression that has been very happily caught. H. S. Mendelssohn, Newcastle, is represented by some capital portrait subjects in the Rembrandtian manner, as also by a landscape remarkable for the successful rendering of sky effect. The Autotype Company have sent several examples of their well-known enlarged portraits of public personages; and from C. Ferranti, Liverpool, come a set of pictures in which, by dint, apparently, of extensive retouching of the negative, there is got a soft mezzotint texture on the flesh and admirable nicety of definition in the folds of voluminous muslin drapery. Nor should we omit to mention, as affording an interesting contrast to all this high-wrought elaboration, some early carbon prints by John Pouncy, Dorchester, one of the first experimenters with the process, including a view of a country house, which, however crude it may now appear, was so recently as 1859 deemed worthy of a silver medal.

Among foreign exhibitors, the Swiss photographers, Taeschler Brothers, come well to the front with a series of full-length female figures, most artistically posed, and worked out with a delicacy of detail which, in the case of a muslin costume, seems to come as near as possible to perfection. A very large photograph by Allenari, of Florence—lent, we believe, by Professor Simpson—reproduces, with all their weather stains, the famous Ghiberti Gates, of which there is a plaster cast in our Industrial Museum. From Hungary F. Cosmata sends, with other highly-artistic work, two portraits of infants in dishabille, as charming in pose, tone, and expression as they are noteworthy for the exquisite definition of accessories; while A. Kereline, a Russian photographer, contributes some capitally-designed groups, of which one, representing the game of blind man's buff in full swing, has been hit off with marvellous dexterity. Two very large pictures, of the Forum and Coliseum respectively, illustrate the skilful application of photography to architectural subjects, by Naja, of Rome. Of American work we noted a set of portraits worked up to a beautiful pearly smoothness of texture by Gutekunst, Philadelphia. Goupil and Company, Paris, have forwarded some exquisite specimens of photogravure, reproducing notable pictures of recent *Salons;* and what we take to be another method of mechanical printing is exhibited in a series of Hamburg shipping scenes by Strumper, where singular sharpness is attained in the rendering of minute details.

Among the local contributions a peculiar interest attaches to a frame of cabinet portraits by Dallas, which, having obtained a medal in the exhibition of ten years ago, may be held to afford a sort of criterion by which to judge contemporary work. Of similar service is a series of the artistic portraits produced many years ago by the late D. O. Hill, R.S.A. John Annan exhibits, among other things, a set of photographs of the recently-inaugurated Prince Consort Memorial, and John Horsburgh an enlarged picture of the inauguration ceremony. Of W. Neilson's portrait work there are several specimens—apparently untouched—exhibiting artistic feeling; while Ross and Pringle send enlarged portraits, evidently worked up with great care, as also, what will be highly attractive to mothers, a great display of babies embowered, or rather embedded, in foliage; and John Moffat contributes a large and varied selection of *cartes*, &c., illustrative of his ordinary practice. Then there are several portrait subjects, large and small, by Wilson, of Aberdeen, together with a series of those Scotch views with which his name has long been associated. Of amateur work we noted a creditable set of Highland bits, including several deer-stalking subjects, by Mr. Williamson; and some beautiful studies of sunlit clouds by Professor Piazzi Smyth, who also exhibits a diagram, interesting, we presume, to the practical photographer, showing the work of the "plano-concave corrector."

An extensive series of photographs lent by W. Harrison, London, shows the application of the art to educational purposes in the popularising of architectural and ethnological subjects, as well as of celebrated paintings and statues; and in a magnificent photolithograph, nearly forty feet long, is reproduced a very curious old engraving of the procession of Pope Clement VII. and the Emperor Charles V. in 1530. When we add that there is a large collection of photographic chemicals and apparatus, the reader will realise the extent and comprehensiveness of an exhibition which ought to prove no insignificant addition to the attractions of the Christmas holidays.

The opening meeting held last night was attended by a large number of ladies and gentlemen. Lord Provost Falshaw, in the course of a few remarks, said the exhibition had taken him by surprise, and he did not believe that such a fine collection had ever before been brought together in Great Britain. The city of Edinburgh had lately witnessed the exhibition of the works of a great painter, and he looked upon the present exhibition as a pleasant interlude between the Raeburn treat and that which might shortly be expected to open in the same galleries. After commending several photographs for their truthfulness and delicacy, his Lordship expressed satisfaction in learning that the exhibition would remain open for a month, and warmly commended it to the attention and admiration of his fellow citizens. He hoped that the ladies would utilise rainy days in visiting the galleries, and be accompanied by their gentlemen friends; in which case, if the lady said, "Is this not beautiful?" the gentleman might at least answer, "Yes, indeed it is." (Laughter.) The exhibition was then declared open.—*Scotsman, 21st December.*

Meetings of Societies.

GLASGOW PHOTOGRAPHIC ASSOCIATION.

An ordinary meeting of this Association was held on Wednesday, the 20th inst. In the absence of the President and Vice-Presidents Mr. Urie was unanimously voted to the chair.

Five gentlemen, who had previously been proposed and seconded, were duly elected members; and there being no questions the Chairman called upon Mr. E. Smithells to read his paper entitled *A Few Odds and Ends.* [See page 620.] At the conclusion of the reading of the paper,

Mr. Gilfillan said he had listened with much pleasure to Mr Smithells' paper, though there was nothing in it that could strictly be called new. He (Mr. Gilfillan) had tried Mr. M. Carey Lea's collocine restrainer, which he had prepared himself according to the formula published in The British Journal of Photography, and had found it to answer his purpose well. Some thought it gave hard results; but he considered it a capital developer, especially for developing what they might fear were over-exposed negatives—negatives which, if developed with the ordinary developers, would have a fogged appearance. Not, however, having experimented sufficiently with it, and his own preparation of the collocine being slightly defective, he could hardly yet arrive at the conclusion whether he would ultimately prefer developers containing it instead of those made with acetic acid. He had found collocine also answer the purpose of citric acid in his pyro. developer; and for its ultimate cheapness over the other acid restrainers he thought that Mr. Lea, in giving to the photographic profession his formula, had conferred a boon on one and all. He hinted that its use might form a fit subject to occupy the attention of able experimentalists.

Mr. Stevenson said he had been left by an Edinburgh gentleman a small bottle of Lea's collocine made by himself, but his experience with it was quite the opposite to that of Mr. Smithells. Although he had used it in different quantities he had found its restraining action so powerful that it was impossible to get anything but a very hard result, the negative having the appearance of under-exposure. He considered that, if used, two or three times the usual exposure would require to be given. Of the emulsion processes he could not speak practically, but remembered having seen in the Journal a letter from a gentleman who had tried Canon Beechey's formulæ in which it was spoken of very highly for its reliability—a quality very much to be desired by dry-plate workers.

Mr. Bell stated that his experience with Lea's collocine was exactly the same as Mr. Stevenson's, having found to his cost, one day, that only very hard negatives could be got by its use; but he thought that, seeing Mr. Smithells had spoken so highly of it, perhaps the quality of the collocine used by the latter gentleman might be superior to that used by himself.

Mr. McNair observed that his experience with the collocine was similar to that of the two gentlemen who had last spoken. In his hands, too, it had only yielded hard negatives. He had noticed, when developing with it, the negatives, when looked *at*, had a seemingly soft and fully-exposed appearance, but when looked *through* they proved exceedingly harsh and lacked softness altogether.

The Chairman considered they ought to be proud of having Mr. Smithells as a member, who, although an amateur not evidently long out of his "teens," had proved himself capable of producing a paper exhibiting much ability. He thought his dry-plate transparencies were excellent, but he should like to have seen the negatives from which they had been taken. As to Lea's collocine: he had also prepared some according to the published formula, and at first succeeded very well; but in a few days he found it to work but indifferently. He had also found in a few days after its preparation a large brown precipitate at the bottom of the developing solution. He said that when too much sulphuric acid was present its restraining action was greatly increased, and he thought that perhaps too much of this acid had been in the solution used by the gentlemen who could only get harsh pictures. With regard to Mr. Smithells' mode of preserving his sensitised albumenised paper for a length of time, he thought that the members present would find the addition of a small quantity of bicarbonate of soda to their silver bath, and the keeping of the sensitised paper between sheets of blotting-paper which had been saturated with this same soda, and dried (as Mr. Smithells had described), of very great advantage to them in the present dark weather. About emulsions he could say little, though he had tried various of them several times, but he never succeeded to any degree of perfection. He considered, however, that to Mr. Smithells and other amateurs who had time the various emulsions presented a splendid field for experiment.

Mr. Smithells, in replying, explained that the transparencies shown were dry-plate productions. They were obtained by placing the prepared

plate in juxtaposition with the negatives in the printing-frame. They were backed up by a matt varnish prepared according to the formula he had given; and he considered Lea's collocine formula an excellent one, which had given in his hands results at least equal to any other developers. He thought negatives to be developed by it did not require any more exposure than usual; in fact, in his experience, he thought it required a little less. If properly tried he believed it would be found to yield good results, and hinted that perhaps those who had failed with it had used it too strong.

During the reading of his paper Mr. Smithells exhibited samples of sensitised paper prepared in the soda bath, showing its keeping qualities over that which had not been so prepared; a small bottle of collocine prepared by himself, and also one of matt varnish; a number of dry-plate transparencies (principally views) that were universlly admired by the members; and an ingenious little apparatus for holding plates while developing.

The far-famed polychromatic photographs of M. Leon Vidal (which had been kindly sent by the Editors of THE BRITISH JOURNAL OF PHOTOGRAPHY, through Messrs. George Mason and Co., of Union-street) were handed round for inspection, and were much admired. A paper was read on the method of their production, together with an abridgment of the patent, by Mr. J. McGhie, 39, Union-street. This paper went over the ground familiar to the readers of this Journal. At its conclusion,

The CHAIRMAN said he did not see how the many tints and half-tones seen in the face of the pictures shown could possibly be produced mechanically, as Mr. McGhie had explained they were, nor more especially could he see how colour could be got to adhere to *nothing*, for in the high-lights and whites of Vidal's pictures there really exists no film whatever, the material of which the film is composed at these parts being entirely dissolved away. He was inclined to think Vidal's process was merely painting on the back of a carbon transparency, either in oil or water colours, with a paper support at the back, the colours thus showing through all the various tints and half-tones of the photograph. By that means really beautiful pictures could be produced, requiring little or no artistic talent, seeing the colours had but to be laid on in blotches. A process similar to the foregoing he had himself published in the *Mechanics' Journal* upwards of twenty-two years ago, using, however, instead of a carbon transparency, a collodion-silver one. He did not think the production of Vidal's pictures would pay commercially, as the process was an extremely difficult one, and the production of even one picture a matter of great uncertainty. As explained a separate negative was required for each colour, and the films of the whole, when printed, had to be made to register properly, which he considered would be a rather difficult operation, seeing that when the films were put on they were in a soft and swelled state, and that when they dried they were certain to contract considerably, thus rendering the joints very liable to be seen in the finished picture. He was also inclined to think that Woodburytype was the process by which would yet be produced polychromic photographs cheaply.

Mr. GILFILLAN thought that the vital question amongst photographers regarding M. Vidal's process was—Will their production pay commercially? He had thought the late Mr. Sutton was the first to propose painting on the back of carbon transparencies in opaque colours, a backing being made by spreading over a layer of plaster of Paris, thus producing a picture almost equal to any burnt-in enamel and as imperishable. But he could hardly think that M. Vidal had been labouring for such a number of years to produce polychromic pictures which were in reality, as Mr. Urie had hinted, but carbon transparencies with blotches of colour on the back. He also believed it quite possible to produce Vidal's pictures without the joints being discernible, seeing that in putting on the different films the operator, from the manner in which he worked, could easily make the various films to register properly. He was, however, inclined to think the Woodburytype would yet supplant M. Vidal's process.

Mr. McGHIE, in replying, said that, as to making the production of polychromic pictures pay commercially, he feared most photographers would fail in that, but stated that in France they were produced in great quantities. He asserted that M. Vidal's pictures were warranted to be produced merely mechanically, and without the aid of brush or pencil, as Mr. Urie had hinted. He explained that in the process lithography and chromolithography had to be taken advantage of, the final shades, he thought, being produced purely photographically. As to their permanence he could say nothing, but concluded that if the colours used were aniline dyes they would most likely prove evanescent.

The unanimous expression of the members present was that, however interesting as a process, as a commercial and workable one M. Vidal's would prove a failure in the hands of most photographers.

A hearty vote of thanks was then given to Mr. Smithells, Mr. McGhie, and the Chairman, and the meeting was adjourned.

PHOTOGRAPHIC SOCIETY OF COLOGNE AND RHENISH WESTPHALIA.

AT the first meeting of this Society twenty-eight members were enrolled. The first business was, of course, the preparation of a set of rules and the election of office-bearers, and when these matters had been satisfactorily settled the meeting proceeded to the discussion of two questions:—Why does a portrait negative sometimes give pictures with broad heads and sometimes with long heads? What is the best retouching medium for gelatine pictures? To the first question

Herr SCHÖNSCHEIDT replied that he thought it was caused by using the paper too damp, and that the elongation took place in the direction in which the paper was smoothed. As a proof of this view he mentioned that when dried the picture never fitted exactly into the space in the sheet of paper from which it was cut.

Herr CREIFELDS said that in pictures the size of the whole sheet there would be a difference of from two to three millimètres after the printing, in consequence of the shrinking of the paper in drying.

Herr SCHÖNSCHEIDT said if that were the cause it might be remedied by using perfectly dry paper.

To the second question

Herr BRICHKE said that he had successfully employed a mixture of ether and albumen.

Herr CREIFELDS recommended water glass.

Herr SCHÖNSCHEIDT objected to that, as water glass was not stable and became displaced in spots.

Herr MEISSNER used thin, raw collodion with good results. He also recommended common colour rubbed down with albumen instead of water, and then a thin coating of dissolved alum.

Herr BAUMANN thought alcohol would be better than alum, but that raw collodion was better than either.

The discussion was continued for some time longer, but nothing of interest transpired, and the meeting was adjourned.

AT a subsequent meeting Herr Creifelds showed a series of photographs of Herr Krupp's factory at Essen.

To the question—Why in an old plate, when cleaned and used again, the first picture sometimes reappeared?

Herr BAUMANN said he did not believe it would reappear if the plate had been perfectly cleaned.

The meeting was brought to a conclusion after an explanation from Herr Creifelds of the well-known Denier process.

Correspondence.

STENOCHROMY.

To the EDITORS.

GENTLEMEN,—Seeing the article in last week's issue on *Stenochromy* it occurs to me that your readers might perhaps like to try what I have tried with a certain amount of success, using, as I do, the Lambertype process.

It is simply this:—Procure some of those "graduated tints" which were used largely some time ago for sketching or in chalks. Prepare their surface with the well-known insoluble gelatine, and use them in place of the shell transfer paper. The effect is exceedingly pretty when suitable graduated tints can be obtained.

I enclose an imperfect one, the only sample I have left, but sufficient, I think, to show that the adoption of such papers might be advantageous. I should, in fact, be almost inclined to suppose that paper specially prepared in this manner would be found to "pay."—I am, yours, &c.,

Blandford Vicarage, December 26, 1876. C. F. C.

CARBON PRINTING.

To the EDITORS.

GENTLEMEN,—The Council of the Photographic Society of Great Britain having arranged that a discussion on *Carbon Printing*, to be opened by Mr. S. Fry, shall take place at the next meeting, on Tuesday, January 9, 1877, at 5A, Pall Mall East, it is requested that members and others who have had any experience in this matter will kindly attend and take part in the discussion, as the occasion will be most interesting, the subject being of paramount importance.—I am, yours, &c.,

December 27, 1876. EDWIN COCKING, *Assistant Secretary.*

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.

To the EDITORS.

GENTLEMEN,—A few days since I received the last issue of the *Journal* of the Photographic Society of Great Britian, and was very much surprised to see the name of Mr. R. J. Friswell on the list of members of council. I always thought the council was elected by the *members* as their representatives, and, therefore, I fail to see why his name appears as such.

I am well aware that he was elected by the council as their Secretary, and while holding that office he had a right to a seat at the council meeting; but now that he has resigned the post of Secretary I should like to know why his name is placed on the list of members of council,

as he was never elected by the members of the Society to that office. At the next annual meeting I, for one, shall strongly oppose his name being published as a member of council, and shall request that his name be withdrawn. I think it out of all order that the members of the present council should countenance such a proceeding.—I am, yours, &c.,

Warren-road, Reigate, December 26, 1876. WILLIAM BROOKS.

THE LATE PHOTOGRAPHIC EXHIBITION.

To the EDITORS.

GENTLEMEN,—One portion of the letter written by your "Occasional Contributor," in your last issue, will at once show that I cannot (nor do I wish to) enter into any argument with him. I simply write to say that his memory is certainly treacherous in respect to the sky-line of one of the pictures to which he alludes, as it is in a far different position to that which he imagines it occupies.—I am, yours, &c., W. DE W. ABNEY.

December 27, 1876.

EXCHANGE COLUMN.

No charge is made for inserting these announcements; but in no case do we insert any article merely *offered for sale*, that being done at a small cost in our advertising pages. This portion of our columns is devoted to exchanges only. It is imperative that the name of the person proposing the exchange be given (although not necessarily for publication, if a *nom de plume* be thought desirable), otherwise the notice will not appear.

A studio, well-made, easy to take down or put up, built in panels, and in good condition, will be exchanged for apparatus, &c., up to £20.—Address, MANAGER, 43, St. Peter's, Canterbury.

Posing chair, cost £3, also interior side slip, half-plate water-tight ebonite bath, and quarter-plate rolling press, offered in exchange for quick-acting *carte* lens by any good maker, or good watch.—Address, W. J. SMITH, 200, Bell Barn-road, Birmingham.

ANSWERS TO CORRESPONDENTS.

☞ *Correspondents should never write on both sides of the paper.*

NOTICE.—Each correspondent is required to enclose his name and address although not necessarily for publication. Communications may, when thought desirable, appear under a *nom de plume* as hitherto, or, by preference, under three letters of the alphabet. Such signatures as "Constant Reader," "Subscriber," &c., should be avoided. Correspondents not conforming to this rule will therefore understand the reason for the omission of their communications.

CARL BLUHM (King William's Town, British Kaffraria, South Africa).—Remittance to hand. Thanks.

AN INQUIRER.—Will Mr. Brightman oblige a correspondent who adopts the foregoing *nom-de-plume* by giving the formula for his intensifier and the details of the mode of application?

SOLENT.—If your name and the town in which you reside be sufficient address, we will send you one or two diagrams indicating the best methods of providing ventilation. We take great interest in the views to which you allude.

WILLIAM BAXTER, Jun.—1. A whole plate can easily be manipulated in a Howard's tent.—2. The kind of varnish to which you make allusion is not procurable in commerce. We can, however, spare you half-an-ounce if you choose to call for it at the Publishing Office of this Journal.

N. SORBY.—The following is an excellent developer for negatives:—

Protosulphate of iron	$\frac{1}{4}$ ounce.
Glacial acetic acid	$\frac{1}{4}$,,
Alcohol	$\frac{1}{2}$,,
Water	8 ounces.

WHITE FRENCH POLISH.—Mr. Maurice O'Connor, writing on the subject of Mr. Cooper's recent inquiries, finds that white hard spirit varnish, when applied in the same manner as French polish, produces a stainless polish on any wood. He states it to be advantageous to warm the wood previous to applying the polish. This kind of varnish can be purchased ready prepared, and in obtaining it no difficulty will be experienced.

W. C. B.—This correspondent, writing concerning residues, says:—"Can you, or any of your correspondents, give an address where may be had a reasonable price for paper cuttings and residues? I am told that no refiner in England would buy such, but would only pay for them after having ascertained the value by melting. This being so, how is it that every refiner on the continent, having the residues weighed, can tell, and will pay, a price he is able to give for them? I think this only fair business. On the contrary, giving a bag full of silver and gold residues for melting, without a certain price of the value being granted, seems, at least, a wonderful way of business."——We reply: if our correspondent will put himself to the trouble of reducing his paper cuttings to ashes by burning them, and will then forward a small quantity by way of sample to any respectable refiner, such as those whose business notices will be found in our Journal and ALMANAC, he may rest assured that he will receive from them an accurate estimate of the value of his residues. Or, if he choose to forward to them the whole stock, any of the refiners wlll reduce it, and forward to him its full value *minus* a small charge for their trouble in effecting the reduction.

ACTINOMETER.—If we understand your question aright it is to the following effect:—Suppose that, to produce an enlarged negative of certain dimensions by the wet collodion process, an exposure of ten minutes is necessary, what exposure will be required to produce an enlarged print on autotype tissue under the same conditions of lighting and lenses? This may be more simply expressed in another question:—What relation does wet collodion bear to autotype tissue with respect to sensitiveness? But for an answer to this query we must refer you to the Autotype Company. We may, however, state that, under the conditions expressed, you would not obtain an enlargement on carbon tissue by exposing a whole day.

YOUNG'S OXYGEN GENERATOR.—Mr. William Birrell, whose name our readers will doubtless recollect as that of the patentee of another oxygen generator, takes us to task for making use of such terms as "automatic" in our article on "Young's Safety Lime-light Apparatus," as being calculated to mislead those of our readers who are not familiar with the oxyhydrogen light. It is quite possible Mr. Birrell has forgotten that we made use of the same term when describing his own apparatus, and that we then explained that we did so without any authority from him or his specification. But, letting that pass, we are somewhat startled to learn from Mr. Birrell's letter that the senses both of ourselves and of those gentlemen who were present in our office when the "Young's apparatus" was tried must surely have deceived us; for, whereas we all, as described in the Journal, imagined that a magnificent light had been obtained, we are now informed by Mr. Birrell that "the apparatus is incapable of producing the oxyhydrogen light at all!" Whether this gentleman has seen the rival apparatus or not we cannot tell—from his letter we infer that he has not; but he sums up as follows:—"1. The apparatus is not self-acting. 2. It cannot make the oxyhydrogen light. 3. There is no novelty in using the dishes for other purposes. 4. There is nothing new in making the lantern packing do for a stand for one or more lanterns." Mr. Birrell adds:—"5. I know that I will be liable to be misunderstood, but truth and right must prevail at last, and the sooner the better." Now what, in such a case, is expected of us? Shall we, out of deference to the feelings of a gentleman who was not present on the occasion of the trial referred to, admit that he is quite right, and that "the apparatus cannot make the oxyhydrogen light" (which, if we ignore the element of human aid, is literally true)? or shall we simply reiterate what is no more than a simple fact, viz., that when making trial of the apparatus, as described by us in the Journal, we got an excellent light and found it very convenient? Waiving altogether such questions, we may observe that there is room enough in the world for both the rival pieces of apparatus, and the one which the public find to possess the greater number of advantages will probably be most successful.

☞ Editorial Communications should be addressed to "THE EDITORS"—Advertisements and Business Letters to "THE PUBLISHER"—at the Offices, 2, York Street, Covent Garden, London, W.C.

SOUTH LONDON PHOTOGRAPHIC SOCIETY.—At the next meeting of this Society, on Thursday next, the 4th January, in the Rooms of the Society of Arts, Adelphi, the session for 1877 will commence with a "popular meeting," when a lantern exhibition will be given, affording an opportunity for members to test and exhibit transparencies of their own making.

LANTERN CONDENSERS.—We have received from Messrs. Harvey, Reynolds, and Co., Leeds, a lantern condenser of a form which that firm are now having manufactured. After having been at some pains to give it a thorough trial, we are enabled to state that it answers its purpose admirably, being specially adapted for such flames as those of the sciopticon and the various forms of argand burner. The focus being short, the illumination is excellent. The lenses are four inches in diameter, and are quite free from striæ, while the combination is symmetrical, being composed of two plano-convex lenses.

METEOROLOGICAL REPORT,

For two Weeks ending December 27, 1876.

Observations taken at 406, Strand, by J. H. STEWARD, Optician.

THESE OBSERVATIONS ARE TAKEN AT 8 A.M.

Dec.	Bar.	Wind.	Wet Bulb.	Dry Bulb.	Max. Tem.	Min. Tem.	Remarks
14	29·93	S	42	44	46	37	Foggy
15	29·94	SE	42	43	46	41	Foggy
16	29·84	SE	42	43	45	40	Dull
18	29·27	E	42	43	47	40	Raining
19	29·18	NW	42	43	48	41	Foggy
20	28·79	S	43	43	—	42	Raining
21	28·80	SW	40	41	45	40	Dull
22	29·11	W	36	37	42	35	Foggy
23	29·36	NE	35	37	40	32	Foggy
25	29·74	NW	38	41	39	34	Raining
26	30·19	E	32	34	45	32	Cloudy
27	29·80	S	44	45	—	32	Raining

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